

--DRAFT--

CONSUMER VIEWS ON TRANSPORTATION AND ENERGY

Elyse Steiner
National Renewable Energy Laboratory

July 2003

Prepared for
OFFICE OF PLANNING, BUDGET FORMULATION, AND ANALYSIS
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
U.S. DEPARTMENT OF ENERGY

TABLE OF CONTENTS

	Page
LIST OF FIGURES	iii
LIST OF TABLES	iii
FOREWORD	vi
ACKNOWLEDGEMENTS	viii
CONTACT INFORMATION.....	viii
1. INTRODUCTION	1
2. ENERGY, OIL AND POLICY.....	4
3. GLOBAL WARMING	26
4. ALTERNATIVE FUELS.....	31
5. CONVENTIONAL, MORE FUEL-EFFICIENT, AND ADVANCED TECHNOLOGY VEHICLES	43
6. TRAVEL AND TRANSPORTATION MODES	75
REFERENCES	83

LIST OF FIGURES

Figure	Page
1 VMT and Gasoline Price Change from Same Period Previous Year	11

LIST OF TABLES

Table	Page
2.1.1 Public Perception of Aspects of U.S. Society That are Threatened by Dependence on Foreign Oil	5
2.1.2 Public Approval of Statements on Dependence on Imported Oil and National Energy Policy	6
2.1.3 European Public's Preference for Energy-Related Research.....	7
2.1.4 Public Concern About the U.S. Dependence on Imported Oil	8
2.1.5 Public Perception of Imported Oil Share	8
2.1.6 European Perception of Energy Dependency	9
2.2.1 Public Perception of U.S. Vulnerability to Energy Crisis	9
2.2.2 Public Perception of the Energy Situation in the Years 2001 and 2003	9
2.2.3 Public Perception of the Likelihood of an Energy Shortage in the Next 5 Years	10
2.2.4 Public Perception of the Energy Crisis	10
2.3.1 Retail Unleaded Regular Gasoline Price in 2000, 2001, 2002	12
2.3.2 Unacceptable Level in the Cost of Gasoline.....	12
2.3.3 Responsible for Soaring Gasoline Prices.....	13
2.3.4 Perceived Effects of Recent Gasoline Price Increases on Driving—Summer 2001	13
2.3.5 Actions to Reduce Gasoline Expenditures in the Last Six Months (February-August 2000) or Planned for the Near Future	14
2.3.6 Perceived Effects of Recent Gasoline Price Increases.....	14
2.3.7 Effects of Low Gasoline Price on Driving – Winter 1999	15
2.3.8 Average Number of Additional Miles Driven Per Year Due to Low Gasoline Prices – Winter 1999	15
2.3.9 Public Assessment of Nature of Current Rise in Gasoline Prices	15
2.3.10 Public Perception of Gas Prices One to Six Months from Today	16
2.3.11 Public Concern About the Price of Gasoline in 2002	16
2.4.1 Public Preference for Solving the Nation's Energy Problems.....	17
2.4.2 Public Perception of Actions That Should Be Taken by Individuals, Government, and/or Business to Reduce Dependence on Imported Oil	18
2.4.3 Actions Taken to Reduce Oil Dependence in the Last Six Months (February-August 2000) or Planned to Be Taken in the Near Future	19
2.4.4 Public Preference for Saving One Gallon of Fuel per Week	20
2.4.5 Possible Actions Taken by Individuals to Reduce Fuel Consumption	21
2.4.6 Public Perception of Ways to Deal with the Energy Situation (Gallup Poll)	22
2.4.7 Public Perception of Ways to Deal with the Energy Situation (NBC/WSJ).....	23
2.4.8 Public Support of Federal Government Actions for U.S. Energy Needs.....	24
2.4.9 Public Perception of Federal Government's Highest Priority	24
2.4.10 Public's Support for Fuel-Efficiency Legislation	25

Table	Page
2.4.11 Policies the Public Would Most/Least Support to Reduce Dependence on Imported Oil	25
3.1.1 Perceived Seriousness of Global Warming Threat	27
3.1.2 Perceived Seriousness of Global Warming Threat and Extent to Which Americans Worry about Global Warming.....	27
3.1.3 When the Effects of Global Warming Will Begin to Happen	25
3.1.4 Public Ranking of Most Important Transportation Problem for the United States in the Year 2020.....	25
3.2.1 Public Support for Actions to Address Global Warming	26
3.2.2 Public Preference for Policy to Reduce Greenhouse Gas Emissions from Vehicles; and Public Willingness to Pay More for Gasoline to Reduce Global Warming	29
4.1.1 Public Perception of Which Fuel Will Replace Gasoline and Diesel and Factors Considered “Extremely Important “ or “Very Important” in Influencing Decisions to Try a New Fuel Technology	32
4.1.2 Public Perception of Best Fuel/ Worst Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available.....	33
4.1.3 Reasons Electricity Would Be the Best Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available	35
4.1.4 Reasons Ethanol Would Be the Best Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available	37
4.1.5 Reasons Hydrogen Would Be the Best Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available	39
4.1.6 Reasons Ethanol Would Be the Worst Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available	40
4.1.7 Reasons Hydrogen Would Be the Worst Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available	41
4.1.8 Reasons Electricity Would Be the Worst Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available	42
5.1.1 Total Number of Years Individuals Plan to Keep Their Vehicle.....	44
5.1.2 Vehicle Acquisition Data.....	45
5.1.3 Primary Reason for Acquiring Current Vehicle and Percentage of In-Market Buyers Saying They Would Consider Purchasing an SUV	45
5.1.4 Trends in Vehicle Attribute Preference, Selected Years 1980–2001	46
5.1.5 Public Perception of Vehicle Size vs. Safety.....	47
5.1.6 Towing Package Preference for a New Vehicle	48
5.1.7 Expected Off-Road Use of a New Vehicle	49
5.1.8 Expected Expenditure for a New Vehicle.....	50
5.1.9 Major Reasons for Preferring a Car to Other Vehicle Types.....	52
5.1.10 Issue is a Major Reason for Those NOT Considering the Purchase of an SUV; and Issue that Could Keep Potential Buyer from Purchasing an SUV	53
5.1.11 Current Vehicle Replacement Methods	53
5.1.12 Public Preference for Purchasing New or Used Vehicles	54
5.1.13 Public Perception of the Effect of Vehicle Price Increases on Purchasing Decisions.....	55
5.1.14 Public’s Willingness to Pay for Vehicle Attributes	56

Table	Page
5.2.1 Public Interest in the Federal Fuel Economy Guide	57
5.2.2 Location of Fuel Economy Data Used for Last Vehicle Purchase	58
5.2.3 Public Interest for Additional Information on the Environmental Impacts of New Light Vehicles.....	58
5.2.4 Public Preference Toward Purchase of Cars with Different Weight, Acceleration and Fuel Economy Parameters	59
5.2.5 Public Perception of Motivation Required to Purchase a More Fuel Efficient Vehicle..	60
5.2.6 Additional Amount the Public is Willing to Pay Extra for Vehicle With a 10 Percent Increase in Fuel Economy.....	62
5.2.7 Number of Years Public is Willing to Accept for Payback of Higher Fuel Economy Vehicle	62
5.2.8 Public Preference Toward Purchasing a More Fuel-Efficient Engine with Different Fuel Availability Options.....	63
5.2.9 Site of Review of the Government's <i>Fuel Economy Guide</i>	64
5.2.10 Europeans Who Do Consider Energy Use when Purchasing a Vehicle	64
5.3.1 Amount of Information Heard Pertaining to Advanced Hybrid-Electric Powertrains	65
5.3.2 Names of Advanced Hybrid-Electric Vehicles Known by the Public and Public's Attitudes Towards Hybrid-Electric SUVs	65
5.3.3 Public's Willingness to Consider the Purchase of a Diesel Engine With a 40 Percent Increase in Fuel Economy and Additional Costs of \$1,500 and Public's Willingness to Pay a Premium for a Clean Diesel Engine.....	67
5.3.4 Additional Amount the Public is Willing to Pay for a Diesel Engine Getting 30 Miles per Gallon Compared to a Gasoline Engine Getting 20 Miles per Gallon	69
5.3.5 Purchase Preference Between Diesel and Gasoline Vehicles by Vehicle Type	70
5.3.6 Reasons for Choosing a Diesel Option	71
5.3.7 Reasons for Rejecting a Diesel Option	72
5.3.8 Consumer Preference for Fuel-Efficient Vehicles.....	73
6.1.1 Number of Air Trips Taken in Past 12 Months and Number of People Planning Spring Travel	75
6.1.2 Public's Willingness to Fly on Airplanes after the Events of September 11, 2001	76
6.1.3 Public's Willingness to Travel Overseas after the Events of September 11, 2001 and Travelers Who Changed Their Travel Plans Made Prior to September 11, 2001	76
6.1.4 Travelers Who Changed Their Mind About Traveling as a Result of SARS and Reasons Why Public has not Begun Planning Intended Spring/Summer Travel.....	77
6.2.1 Public Ranking of the Most Irritating Part of Driving.....	78
6.2.2 Most Important Reasons for Travel Delay.....	79
6.2.3 Public's View of Daily Traffic	79
6.2.4 Public's View of Future Traffic.....	79
6.2.5 Changed Schedule Because of Traffic and Ways Public Has Changed Because of Traffic	80
6.2.6 Ways Public Has Changed Because of Traffic; and Decisions Affected by the Amount of Traffic	81
6.2.7 Frequency of Getting Stuck in Traffic Jams	82
6.2.8 Reasons for Using Public Transit	82

FOREWORD

This report has been assembled to provide the Office of Energy Efficiency and Renewable Energy (EERE) with an idea of how the American public views various transportation, energy, and environmental issues. Some of the findings are presented below to illustrate the type of information in the report. Below is a sample of how respondents have answered some of the questions in selected surveys contained in this report:

1. 86% **strongly or somewhat agree** that decreasing our dependence on foreign oil is important to our national security. [11/01, Table 2.1.2]
2. 86% are **very or somewhat concerned** the U.S. is dependent on imported oil. [4/01, Table 2.1.4]
3. Strong support for mandating more fuel efficient new vehicles:
 - a. 85% [5/01, Table 2.4.7]
 - b. 87% [6/01, Table 2.4.8]
 - c. 89% [4/01, Table 2.4.9]
 - d. 79% [2001, Table 2.4.10]
4. But, if more efficient vehicles cost more, about one-fifth of the respondents is **unwilling** to pay more for higher efficiency. One-fifth (20%) is willing to pay more than \$2,500 for increased fuel economy. [11/01, Table 5.2.5]
5. If we had to reduce dependence on imported oil using four options,
 - a. 48% favor making personal vehicles more efficient
 - b. 24% favor tax refunds for higher efficiency vehicles
 - c. 11% favor higher taxes on less efficient vehicles
 - d. 6% favor higher taxes on gasoline and diesel fuel
 - e. 11% had no answer [5/01, Table 2.4.11]
6. When ranking the **most important problem** (of the five provided) for the U.S. in the year 2020:
 - a. 34% chose traffic congestion
 - b. 28% chose availability and/or price of gasoline
 - c. 14% chose global warming
 - d. 12% chose local air pollution
 - e. 7% chose traffic deaths and injuries
 - f. 4% had no answer [12/00, Table 3.1.4]
7. Looking ahead to six months from now, do you think gas prices at that time will be: higher than they are today, about the same, or lower than they are today?
 - a. Higher than they are today 20% [06/00], 38% [05/01], and 51% [02/03]
 - b. About the same 28% [06/00], 37% [05/01], and 26% [02/03]
 - c. Lower than they are today 50% [06/00], 24% [05/01], and 20% [02/03, Table 2.3.12]

8. Of the three options, which would be best (or worst) **to replace gasoline**:
 - a. 52% said electricity was best, 15% said it would be the worst choice
 - b. 21% said ethanol was best, 28% said it would be the worst choice
 - c. 15% said hydrogen was best, 27% said it would be the worst choice [12/00, Table 4.1.3]
9. The major issue that could keep a potential buyer from purchasing an SUV is:
 - a. Price of gas 42%
 - b. Rollover/ safety concerns 38%
 - c. Too big for the road 20%
 - d. Impact on foreign oil dependence 22%
 - e. Impact on environment 20% [03/03, Table 5.1.10]
10. In the J.D. Power and Associates 2003 Initial Quality Study released in May, fuel consumption was the second most common driver complaint. In the 17 years of the annual survey, this was the highest ranking for fuel consumption ever; it had never before cracked the top five.
11. The percentage of people willing to pay for certain new vehicle attributes and the average dollar amount of those willing to pay are listed below:
 - a. Emergency electricity for home—51% would pay on average \$940
 - b. Use of HOV or carpool lanes—28% would pay on average \$540
 - c. 50% quieter than conventional vehicle—42% would pay on average \$890
 - d. Electrical outlet to run electronics or small appliances—46% would pay on average \$800 [03/03, Table 5.1.13]
12. Able to name a hybrid vehicle for sale in the U.S.
 - a. Honda 15% [8/00], 24% [11/01] and 24% [11/02]
 - b. Toyota 4% [8/00], 11% [11/01] and 10% [11/02, Table 5.3.2]
13. As a result of the events that occurred on September 11, 2001, would you say that now you are less willing to fly on an airplane?
 - a. Less willing 43% [09/01] and 33% [09/02]
 - b. Not less willing 56% [09/01] and 65% [09/02, Table 6.1.2]
14. As a result of the events that occurred on September 11, 2001, would you say that now you are less willing to travel overseas?
 - a. Less willing 48% [09/01] and 47% [09/02]
 - b. Not less willing 48% [09/01] and 50% [09/02, Table 6.1.3]

An issue that still needs attention from EERE is the finding that the public tends to lack information about hybrid vehicles, hydrogen and alternative fuels for passenger vehicles. Also, the public seems to want fuel efficiency improvements and cleaner fuels, but is not very willing to pay for these benefits. The public also says that it supports initiatives to promote energy conservation over increased production and that it is willing to make changes such as driving less in its effort to reduce oil consumption.

ACKNOWLEDGEMENTS

I would like to thank Philip Patterson of the U.S. Department of Energy and Margaret Singh of Argonne National Laboratory for providing comments and suggestions on improving this report.

I also want to acknowledge the previous authors of the 2002 Transportation Energy Survey Data Book and the 1998 Data Book on Vehicle Consumer Characteristics and Trends:

Stacy C. Davis
Tatyana Gurikova
John Maples
Vincent Schaper
James Moore
Philip Patterson

CONTACT INFORMATION

Users of *Consumer Views on Transportation and Energy* are encouraged to comment on the content and organization of this report to one of the persons listed below.

Elyse Steiner
National Renewable Energy Laboratory
Suite 930
901 D Street, SW
Washington, DC 20024
Telephone: (202) 646-5055
Fax: (202) 646-7780
E-mail: elyse_steiner@nrel.gov
Website:

Philip Patterson
Office of Planning, Budget Formulation, and Analysis
Energy Efficiency and Renewable Energy
Department of Energy, EE-30
Forrestal Building, Room 5F-034
1000 Independence Avenue, SW
Washington, DC 20585
Telephone: (202) 586-9121
Fax: (202) 586-1637
E-mail: philip.patterson@hq.doe.gov
Website: <http://www.ott.doe.gov/facts/papers.shtml>

1. INTRODUCTION

The transportation sector is the major consumer of oil in the United States. In 2002, the transportation sector's share of U.S. oil consumption was 69 percent (U.S. DOE/EIA 2003 Annual Energy Outlook). As a result, the transportation sector is one of the major producers of greenhouse gases. In 2002, the transportation sector accounted for just over one-third (34 percent) of carbon emissions (U.S. DOE/EIA 2003 Annual Energy Outlook). In comparison, the industrial sector accounted for 28 percent and residential and commercial sector for 38 percent of carbon emissions in 2002.

Compared to the rest of the world, the United States does not have a large oil reserve. The United States accounts for only 9 percent of oil production (U.S. DOE/EIA, 2003c, Table 4.1c). In comparison, the Organization for Petroleum Exporting Countries (OPEC) produces 40 percent of oil. (U.S. DOE/EIA, 2003c, Table 1.1a). More than half (53 percent) of oil consumed in the United States is imported (U.S. DOE/EIA 2003 Annual Energy Outlook). There are three ways to achieve a reduction in transportation oil use: efficiency, substitution, or less travel. A reduction in oil usage, less travel, and fuel substitution, depending on the source, would all result in a reduction of carbon emissions.

Successful transition to alternative types of fuel and advanced technology vehicles may depend on consumer awareness of U.S. dependence on imported oil and the U.S. energy situation. Successful transition may also depend on knowledge of alternative types of fuels and advanced technologies on the part of the public. The *Consumer Views on Transportation and Energy* examines the public's knowledge, beliefs and expectations of the energy situation in the United States and transportation energy-related issues.

The data presented in the report have been drawn from multiple sources: surveys conducted by the Opinion Research Corporation International (ORCI) for the National Renewable Energy Laboratory (NREL) that are commissioned and funded by EERE, Gallup polls, ABC News/*Washington Post* polls, NBC News/*Wall Street Journal* polls, polls conducted by the Ipsos-Reid Corporation, as well as articles from *The Washington Post* and other sources. All surveys are telephone interviews conducted with randomly selected national samples of adults 18 years of age and older. Surveys were conducted before and after the September 11, 2001 terrorist attacks, when energy prices were both high and low, and when the economy was both strong and weak. The surveys use national samples, and the sample size is noted, wherever it is available.¹

The *Consumer Views on Transportation and Energy* consists of six sections, including the introduction (Section 1). Section 2 examines public concern about U.S. dependence on imported oil, public assessment of the energy situation in the United States, and perceived effects of gasoline prices on individuals and households. In addition, this section focuses on public expectations and Federal Government actions that can be undertaken to deal with the energy situation and reduce dependence on imported oil.

¹ In general, the sample sizes are around 1,000 adults.

Section 3 examines public awareness of global warming issues and perceived strategies of the United States and other lesser-developed countries to combat global warming. Section 4 analyzes what Americans think about alternative fuels such as electricity, ethanol, hydrogen and other fuel types.

Section 5 focuses on conventional and advanced technology vehicles. In this report, advanced technology vehicles include hybrid electric and diesel vehicles. The section examines the decisions vehicle owners make about their vehicles, as well as decisions about replacing vehicles. Section 5 also analyzes owners' decisions about purchasing more fuel-efficient vehicles and advanced technology vehicles. Section 6 looks at public attitudes towards travel, with an emphasis on the post-September 11 period. The public's perception of on-road travel and traffic congestion is also addressed in the final section.

Most of the tables presented in the report are the results of survey questions that required respondents to choose among specific answers. When this type of question is asked, the interviewer rotates the order in which the choices are given in order to reduce bias. Some survey questions allowed the respondent to provide any response; these questions are referred to as open-ended questions. Some tables present results of questions in which respondents are allowed to provide more than one answer. Because of a possibility of multiple responses to the same question, results of these tables will not sum to 100 percent.

The *Consumer Views on Transportation and Energy* is a continuation of a joint effort of the EERE Transportation Analytic Team. It builds upon the *Data Book on Vehicle Consumer Characteristics and Trends* that started as a working report to inform EERE project managers of important vehicle market characteristics and ensure that EERE-supported technologies met the needs of consumers and upon the 2002 *Transportation Energy Survey Data Book*.

WHAT'S NEW

In this edition of the *Consumer Views on Transportation and Energy*, there are several new additions, updates, and improvements over the previous *Transportation Energy Survey Data Book*. First, there is a new section on attitudes towards travel and the various transportation modes in the U.S. There has been quite a bit of interest in this topic in the context of current world political, social, and economic events, and a number of new surveys with interesting results have been published. Both the American public and private industry have been significantly affected by changes over the past couple years and have had to react to these changes. The September 11, 2001 attacks, the war with Iraq, the threat of terrorism, security concerns in general, SARS, and higher industry costs have all played a role in how the public now thinks about travel decisions. In light of these historic developments, it was decided to include travel survey information in the new *Consumer Views on Transportation and Energy*.

In addition, there is new survey data on consumer attitudes towards sport utility vehicles (SUVs) in the U.S. Over the past decade, there has been a noticeable shift from cars to SUVs and light trucks throughout the country. Nearly 4.2 million sport utility vehicles (57 models) were sold in 2001. This is quite a change from 1990 when 30 models had sales of fewer than one million vehicles. However, new concerns over the safety and fuel efficiency of these larger, heavier vehicles have been brought to the public's attention. In *Consumer Views on Transportation and*

Energy, more data on the public perception of SUVs have been added. Another new addition is the comparison to European attitudes towards fuel use and renewable energy. Transportation energy use is a major concern around the world, and survey results from the European Union have been included to show similarities and differences to the U.S.

Finally, Opinion Research Corporation (ORC) and Gallup poll results for 2002 and 2003 have been included. ORC surveys were conducted in March 2002, November 2002, and March 2003. The new Gallup polls were conducted in March 2002 and March 2003. Some of the same energy and environment questions were asked by ORC and Gallup over the past several years. The latest results have been added to the prior ones to show the most current opinions and trends over the past several years.

2. ENERGY, OIL AND POLICY

Public opinion polls reveal that the U.S. public perceives the country's oil dependence as a serious threat to jobs and economy, the U.S. standard of living, national security and the environment (Table 2.1.1). After the terrorist attacks on September 11, 2001, an overwhelming majority of Americans believe that decreasing U.S. dependence on foreign oil is important to national security (Table 2.1.2). Because of this perception, U.S. adults are concerned about dependence on imported oil (Table 2.1.4), but many do not have an accurate idea of how much oil is imported (Table 2.1.5). Similarly, in the European Union, the public is concerned about dependence on foreign energy. There is significant interest in developing more internal energy sources and in promoting greater energy conservation (2.1.6).

Concern about oil dependence leads to the public's assessment of the energy situation in the country as serious, although the public in 2003 believes it to be less so than just two years earlier. (Table 2.2.1, 2.2.2). Americans are likely to change their evaluation of the seriousness of the energy situation based on recent events such as the California energy crisis. U.S. adults are more likely to evaluate the United States as not just vulnerable to, but heading into and already in, an energy crisis as the economic situation deteriorates over time (Tables 2.2.2, 2.2.3).

A number of surveys researched the U.S. public's driving expectations when gasoline prices fluctuate. Even though they tend to claim otherwise (Table 2.3.7), the fact is that Americans drive more when gasoline prices are low. This finding is supported by the relationship between vehicle miles traveled (VMT) and gasoline price shown in Figure 1. However, when gasoline prices go up, a majority of the adult population said it would not reduce the amount of driving because of the increase (Table 2.3.3). Further, a majority of U.S. adults report that gasoline price increases have not caused financial hardship for them or their households (Table 2.3.6). However, when asked about actions they undertook or planned to undertake in the near future to reduce gasoline expenditures, an overwhelming majority of Americans (76%) reported a change in lifestyle due to a gasoline price increase (Table 2.3.5).

Surveys have revealed that U.S. adults are likely to change their views on the nature of gasoline price changes based on their assessment of the seriousness of the energy situation in the country (Table 2.3.11). In the most recent Gallup Poll (02/03), people expected gas prices to be higher in one month (75%) and in six months (51%). A much smaller percentage, 5% and 20%, thought that gas prices would be lower in one month and six months, respectively (Table 2.3.12).

In order to reduce U.S. oil dependence and deal with the energy situation, the U.S. public strongly favors energy conservation over energy production and also supports legislation for more energy-efficient vehicles (Table 2.4.1, 1.4.7, 1.4.8). One out four U.S. adults said he/ she purchased or planned on purchasing a more fuel-efficient vehicle as an action to reduce oil dependence (Table 2.4.3). Besides that, they mentioned reduction of the amount of driving and greater use of mass transit and carpool as a way of saving fuel (Tables 2.4.3, 2.4.4). A survey that asked people to compare four different policies on oil dependence reduction found that a regulation to make personal vehicles more efficient received most support (48%). This policy received much higher approval than higher fuel taxes (6%) or taxes on less-efficient vehicles (11%) (Table 2.4.11). However, none of the surveys discussed the fuel economy level that should be mandated or what the effect would be on vehicle prices.

2.1 PUBLIC CONCERN ABOUT U.S. DEPENDENCE ON IMPORTED OIL

Q2.1.1: Some people believe that depending on this much foreign oil threatens various aspects of our society while others do not believe depending on this much foreign oil threatens us in any way. Please tell me how serious a threat you think our dependence on foreign oil is to each of the following: very serious, somewhat serious, not too serious, or not at all serious.

- A. Our national security
- B. Jobs and economy
- C. The environment
- D. Our standard of living

Table 2.1.1. Public Perception of Aspects of U.S. Society That Are Threatened by Dependence on Foreign Oil

Aspects of Society to which Dependence on Foreign Oil Represents a “Very Serious” or “Somewhat Serious” Threat	Number	Percent
Jobs and the economy	858	86
U.S. standard of living	828	83
U.S. national security	769	77
The environment	702	70

Source: Research/Strategy/Management, Inc., October 21, 1998, N=1,003.

Q2.1.2: Do you strongly agree, somewhat agree, somewhat disagree, or strongly agree with the following statements?

Table 2.1.2. Public Approval of Statements on Dependence on Imported Oil and National Energy Policy

Statements	Strongly Agree (%)	Some-what Agree (%)	Some-what Disagree (%)	Strongly Disagree (%)	No Opinion (%)	Total (%)
Decreasing our dependence on foreign oil and gas is important to our national security. ¹	49	37	7	5	2	100
Increasing domestic production of oil, gas is important to our national security. ¹	38	40	10	8	4	100
New technologies have made it possible to explore for oil and gas in environmentally friendly ways.	29	46	12	5	8	100
The introduction of a national energy policy will help to boost energy conservation efforts.	18	54	15	6	7	100
Passing a national energy policy will improve the economy and put people back to work.	19	45	21	7	8	100

Source: Ipsos-Reid Inc., November 14, 2001, N=532

¹ Half sample

Q2.1.3: In which of the following areas would you like to see more energy-related research in the European Union? (Asked in European Union)

Table 2.1.3. European Public's Preference for Energy-Related Research

Prefer More Research In	Percent
Renewables	69
Cleaner transport	51
Nuclear fusion	21
Gas	13
Nuclear fission	10
Oil	6
Coal	5
Other	1
Would not like to see more energy-related research	2
Don't know	10

Source: The European Opinion Research Group (2002), N = 16,032.

Q2.1.4: The United States now imports 54 percent of its oil supplies. This fraction is growing. How concerned are you about the fact that the United States is dependent on imported oil?

Table 2.1.4. Public Concern About U.S. Dependence on Imported Oil

Degree of Public Concern	Number	Percent
Very concerned	472	50
Somewhat concerned	343	36
Not at all concerned	120	13
Don't know	6	1
Total	941	100

Source: ORCI for NREL (2001a), Study #710148, N=941.

- Q2.1.5:** An energy crisis occurred 25 years ago, in 1973, when the United States imported about one-third of its oil from foreign sources and that oil was shut off. Today, what percentage, from zero to one hundred, of its oil do you think the United States imports from foreign sources?

Table 2.1.5. Public Perception of Imported Oil Share

Percent of Oil Used in U.S. that is Imported	Number	Percent
0% to 20%	52	5
21% to 40%	152	15
41% to 50%	237	24
51% to 60%	120	12
61% to 70%	134	13
71% to 80%	215	21
81% to 100%	77	8
Don't Know	16	2
Total	1,003	100

Source: Research/Strategy/Management, Inc., (1998), N=1,003.

- Q2.1.6:** 50% of the energy in the European Union comes from outside the European Union. This dependency is expected to increase in the future. With which of the following statements, if any, do you agree? (Asked in European Union)

Table 2.1.6. European Perception of Energy Dependency

Agree with the Following	Percent
It is an urgent issue	37
Energy imports (of coal, oil, gas, etc.) from outside the EU should be reduced	25
More energy sources should be developed within the EU	52
More should be done to encourage energy saving in the EU	51
There are issues which are more urgent	12
None of these	1
Don't know	7

Source: The European Opinion Research Group (2002), N = 16,032.

2.2 PUBLIC ASSESSMENT OF THE ENERGY SITUATION

Q2.2.1: In fact, the United States imports about half of its oil from foreign sources—more than it did 25 years ago. Based on this fact, how vulnerable do you believe the United States is to an energy crisis that would be caused by foreign nations shutting off their supply of oil to the United States: very, somewhat, not too, not at all?

Table 2.2.1. Public Perception of U.S. Vulnerability to Energy Crisis

Categories of Responses	Number	Percent
Very vulnerable	471	47
Somewhat vulnerable	364	36
Not too vulnerable	118	12
Not at all vulnerable	35	3.5
Don't know/refused	15	1.5
Total	1,003	100

Source: Research/Strategy/Management, Inc., (1998), N=1,003.

Q2.2.2: How serious would you say the energy situation is in the United States: very serious, fairly serious, or not at all serious?

Table 2.2.2. Public Perception of the Energy Situation in the Years 2001 - 2003

The Energy Situation in the U.S. is	March 2001 (%)	May 2001 (%)	June 2001 (%)	March 2002 (%)	March 2003 (%)
Very serious	31	58	47	22	28
Fairly serious	59	36	43	63	59
Not at all serious	9	4	8	12	11
No opinion	1	2	2	3	2
Total	100	100	100	100	100

Sources: Gallup Poll (2001a), N=1,014; (2001b), N=505; (2001c), N=1,060; (2002b) N=1,006; (2003b) N= 1,003.

Q2.2.3: Do you think that the United States is or is not likely to face a critical energy shortage during the next five years?

Table 2.2.3. Public Perception of the Likelihood of an Energy Shortage in the Next 5 Years

Likely to Face an Energy Shortage	March 2001 (%)	March 2002 (%)	March 2003 (%)
Yes, is likely	60	48	56
No, is not likely	36	49	40
Already facing one	1	1	1
No Opinion	3	2	3

Sources: Gallup Poll (2001c), N=1,060; (2002b), N=1,006; (2003b) N=1,003.

Q2.2.4: Do you think the United States is heading into an energy crisis? Do you think the United States is in an energy crisis now?

Table 2.2.4. Public Perception of the Energy Crisis

The United States Is	Yes (%)	No (%)	Total (%)
Heading into an energy crisis	61	36	97
In an energy crisis	39	60	99

Source: ABC News/*Washington Post*, (2001), N=1,004.

2.3 ACTUAL AND PERCEIVED EFFECTS OF GASOLINE PRICES ON DRIVING

Among those who answered that they drive more when gasoline prices are low, the average number of additional miles during the year they said they planned to drive was 3,535 (Table 2.3.8). This is consistent with the data showing that when gasoline prices are lower, people tend to use their cars more; and conversely, when gasoline prices rise, driving declines. Figure 1 below shows the close relationship between the price of a gallon of gasoline and the change in the amount of driving in the United States since 1999.

Figure 1. Vehicle Miles Traveled (VMT) and Gasoline Price Change from Same Period in the Previous Year

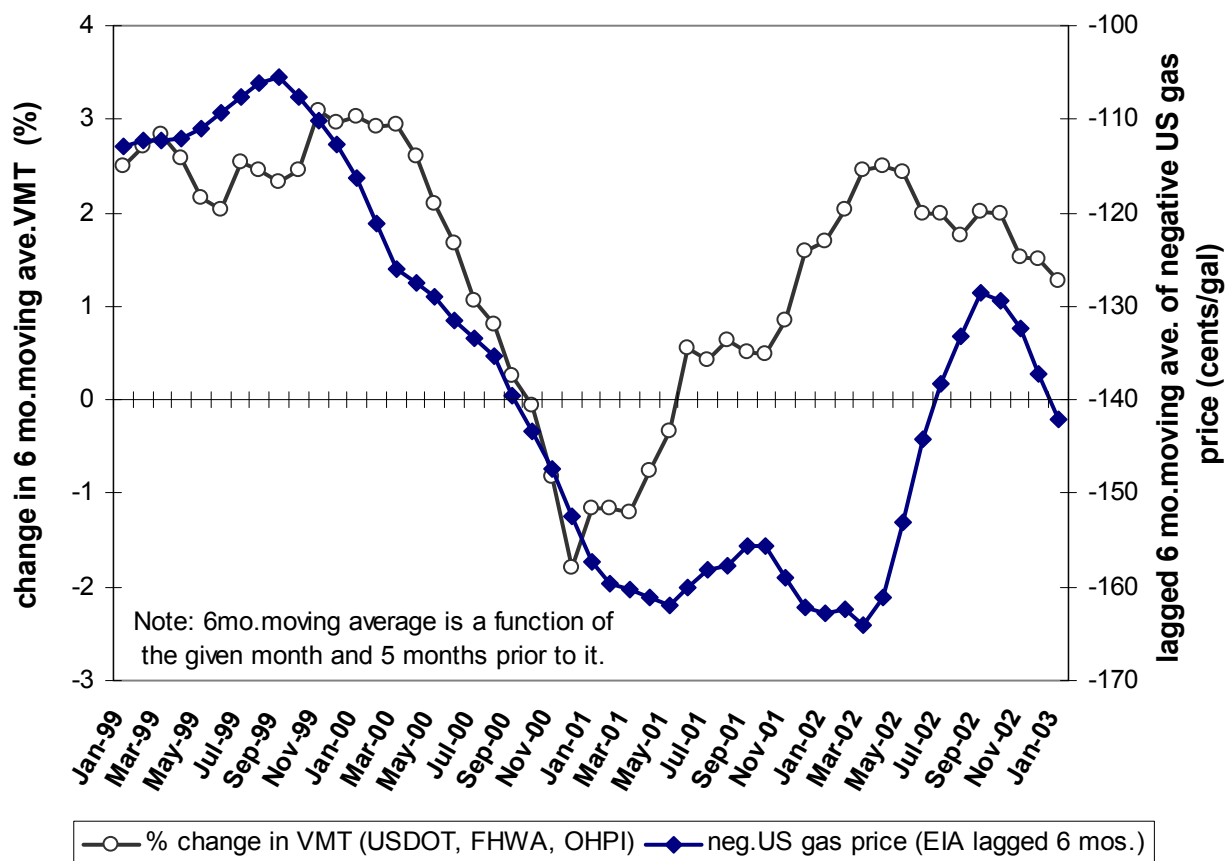


Table 2.3.1. Retail Unleaded Regular Gasoline Price in 2000, 2001, and 2002
(Cents Per Gallon, Including Taxes)

YEAR	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2000	130.1	136.9	154.1	150.6	149.8	161.7	159.3	151.0	158.2	155.9	155.5	148.9
2001	147.2	148.4	144.7	156.4	172.9	164.0	148.2	142.7	153.1	136.2	126.3	113.1
2002	113.9	113.0	124.1	140.7	142.1	140.4	141.2	142.3	142.2	144.9	144.8	139.4

Source: U.S. DOE/EIA (2001a), Table 9.4; U.S. DOE/EIA (2003), Table 9.4.

Q2.3.2: What do you consider an unacceptable level in the cost of a gallon of unleaded gasoline?

Table 2.3.2. Unacceptable Level in the Cost of Gasoline

Cost	Total %	East %	South %	Central %	West %
\$1.85	57.9	57.0	63.5	66.3	47.6
\$2.00	18.2	19.1	15.6	18.9	19.4
\$2.15	6.2	8.7	4.5	3.0	10.3
\$2.30	1.7	1.7	1.1	1.3	2.8
\$2.45	1.8	2.1	1.1	1.7	2.5
\$2.60+	6.6	7.2	9.6	4.3	11.7
Not Sure	5.9	4.2	4.6	4.4	11.7

Source: Zogby International, September 2000.

Q2.3.3: Who or what do you feel is most responsible for the soaring gasoline prices?

Table 2.3.3. Responsible for Soaring Gasoline Prices

	Total %	Large City %	Small City %	Suburbs %	Rural %	NS %
Oil Companies	30.8	29.4	29.4	31.8	33.0	32.5
OPEC	18.4	20.0	16.2	16.8	19.6	16.2
Presidents	17.5	19.3	19.2	15.9	15.6	
Gas guzzling cars and SUVs	4.6	6.0	3.4	5.9	2.7	11.9
Increased Demand	8.3	6.1	10.9	8.6	8.6	16.2
Environmental Demands	5.2	5.1	4.4	5.7	5.4	
Taxes	3.8	5.4	3.6	3.8	2.2	
Other	4.2	4.4	2.9	3.0	6.1	
Not Sure	7.0	4.3	9.9	8.5	6.8	23.2

Source: Zogby International, May 2001, N=1,233, margin or error +/- 3%.

Q2.3.4: Will the price of gas cause you to drive less than you might have otherwise this summer, or not?

Table 2.3.4. Perceived Effects of Gasoline Price Increases on Driving – Summer 2000, 2001

Driving Expectations	May 2000 (%)	June 2000 (%)	May 2001 (%)
The price of gas will cause me to drive less than I might have otherwise this summer.	41	50	58
The price of gas will not cause me to drive less than I might have otherwise this summer.	57	49	41
No opinion	2	1	1
Total	100	100	100

Sources: Gallup Poll (2000a), N=1,005; (2000b), N=1,005; (2001b), N=1,005.

Q2.3.5: Which, if any, of the following have you done in the last 6 months, or do you plan on doing in the near future, to reduce gasoline expenditures? (Aided, multiple answers allowed.)

Table 2.3.5. Actions to Reduce Gasoline Expenditures in the Last Six Months (February–August 2000) or Planned for the Near Future

Actions To Reduce Gasoline Expenditures	Number	Percent
Any (net)	718	76
Drive less	424	45
Walk or bike	267	28
Purchase more fuel-efficient vehicle	239	25
Carpool	198	21
Drive a different vehicle than usual	162	17
Begin or increase telecommuting	137	15
Use mass transit more often	123	13
Cancel a vacation trip	94	10
Other	19	2
Nothing	203	22
Don't know	20	2
Total	941	100

Source: ORCI for NREL (2000a), Study #709318, N=941.

Q2.3.6: Have recent price increases in gasoline caused any financial hardship for you or your household?

Table 2.3.6. Perceived Effects of Recent Gasoline Price Increases

Effects of Recent Price Increase In Gasoline	May 2000 (%)	June 2000 (%)	May 2001 (%)	February 2003 (%)
Recent price increases in gasoline have caused financial hardship for my household or me.	36	44	47	35
Recent price increases in gasoline have not caused financial hardship for my household or me.	64	56	53	65
Total	100	100	100	100

Sources: Gallup Poll (2000a) N=1,014; (2000b), N=1,014; (2001b), N=1,005; (2003c) N=1,002.

Q2.3.7: Do you now drive your vehicle more because of the current low price of gasoline?

Table 2.3.7. Effects of Low Gasoline Prices on Driving – Winter 1999

Effects of Low Price of Gasoline On Driving	Number	Percent
Drive my vehicle more now because of the current low price of gasoline	130	13
Do not drive my vehicle more now because of the current low price of gasoline	815	82
Don't know/don't own vehicle	54	5
Total	999	100

Source: ORCI for NREL (1999a), Study #70809, N=1,000.

Q2.3.8: On average, how many miles **extra** are you driving your vehicle per year?

Table 2.3.8. Average Number of Additional Miles Driven per Year Due to Low Gasoline Prices – Winter 1999

Average Number of Additional Miles	Number	Percent
1–500	33	25
501–1,000	14	11
1,001–2,000	21	16
2,001–5,000	26	20
More than 5,000	16	12
Don't know	21	16
Total	131	100
Mean¹	3,535	
Standard deviation¹	5,251	

Source: ORCI for NREL (1999), Study #70809, N=130.

¹ In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don't know” responses are not part of the calculations.

Q2.3.9: Do you think the current rise in gasoline prices represents a temporary fluctuation in prices or a more permanent change in prices?

Table 2.3.9. Public Assessment of Nature of Current Rise in Gasoline Prices

Current Rise in Gasoline Prices Represents	Mar 2000 (%)	May 2000 (%)	June 2000 (%)	May 2001 (%)	February 2003 (%)
Temporary fluctuation in prices	60	45	57	40	62
More permanent change in prices	37	50	39	56	36
No opinion	3	5	4	4	2
Total	100	100	100	100	100

Sources: Gallup Poll (2000a), N=500; (2000b), N=500; (2000c), N=500; (2000d), N=500; (2001b), N=500; (2003c) N=480.

Q2.3.10: Looking ahead to one month from now, do you think gas prices at that time will be: higher than they are today, about the same, or lower than they are today?

Looking ahead to six months from now, do you think gas prices at that time will be: higher than they are today, about the same, or lower than they are today?

Table 2.3.10. Public Perception of Gas Prices One and Six Months from Today

Looking Ahead, Gas Prices Will Be	One Month From Now (%)				Six Months From Now (%)			
	May 2000	June 2000	May 2001	Feb 2003	May 2000	June 2000	May 2001	Feb 2003
Higher than they are today	51	38	83	75	24	20	38	51
About the same	33	39	13	19	25	28	37	26
Lower than they are today	14	22	3	5	49	50	24	20
No opinion	2	1	1	1	2	2	1	3
Total	100	100	100	100	100	100	100	100

Sources: Gallup Poll (2000b) N=N/A, (2001a) N=N/A, (2003c) N=522.

Q2.3.11: How concerned are you about the price you will pay for gasoline over the next year?
Would you say: very concerned, somewhat concerned, or not at all concerned?

Table 2.3.11. Public Concern About the Price of Gasoline in 2002

Degree of Public Concern	Number	Percent
Very concerned	462	49
Somewhat concerned	334	36
Not at all concerned	142	15
Don't know	3	small base
Total	941	100

Source: ORCI for NREL (2001a). Study #710148, N=941.

2.4 PUBLIC BELIEFS ABOUT ACTIONS TO ADDRESS THE ENERGY PROBLEMS

Q2.4.1: Which of the following approaches to solving the nation's energy problems do you think the United States should follow right now: emphasize production of more oil, gas and coal supplies, or emphasize more conservation by consumers of existing energy supplies?

Table 2.4.1. Public Preference for Solving the Nation's Energy Problems

Approaches to Solving the Nation's Energy Problems the US Should Follow Now	March 2001 (%)	May 2001 (%)	March 2002 (%)	March 2003 (%)
Emphasize production of more oil, gas, and coal supplies	33	35	30	29
Emphasize more conservation by consumers of existing energy supplies	56	47	60	60
Both/equally	8	14	6	7
Neither/other	1	2	2	2
No opinion	2	2	2	2
Total	100	100	100	100

Sources: Gallup Poll (2001b), N=505; (2001c), N=505; (2002b) N=1,006; (2003b) N=1,003.

Q2.4.2: If it became more important for the United States to reduce dependence on imported oil, what actions do you think should be taken by individuals, government, and/or business?

Table 2.4.2. Public Perception of Actions that Should Be Taken by Individuals, Government, and/or Businesses to Reduce Dependence on Imported Oil

Actions that Should Be Taken By Individuals, Government, and/or Businesses To Reduce Dependence on Imported Oil		Number	Percent
Conservation/reduce consumption (net)		229	24
Conservation/reduce consumption (unspecified)		129	14
Research/use more fuel-efficient cars		34	4
Carpool		25	3
Provide/use public transportation		24	3
Drive less/walk/bike more/ration gas		31	3
All other conservation/reduce consumption mentions		22	2
Other sources of oil	Drilling, use U.S. oil reserves	195	21

Actions that Should Be Taken By Individuals, Government, and/or Businesses To Reduce Dependence on Imported Oil		Number	Percent
Alternative energy sources (net)		167	18
	Research/use alternative energy sources (unspecified)	93	10
	Research/ use our own natural resources	16	2
	Research/use electric cars	16	2
	Research/use cars that don't use gas but use solar energy, nuclear power, wind power, other alternative energy sources	55	5
Change prices		39	4
Government involvement	Government/Government's responsibility	38	4
Environmental concerns		23	2
Other		107	12
Nothing		48	5
Don't know		206	22
Total		941	112

Source: ORCI for NREL (2001a), Study #710148, N=941.

Q2.4.3: Which, if any, of the following have you done in the last 6 months, or do you plan on doing in the near future, to reduce gasoline expenditures?

Table 2.4.3. Actions Taken to Reduce Oil Dependence in the Last Six Months (February–August 2000) or Planned to Be Taken in the Near Future

Actions To Reduce Gasoline Expenditures	Number	Percent
Any (net)	718	76
Drive less	424	45
Walk or bike	267	28
Purchase more fuel-efficient vehicle	239	25
Carpool	198	21
Drive a different vehicle than usual	162	17
Begin or increase telecommuting	137	15
Use mass transit more often	123	13
Cancel a vacation trip	94	10
Other	19	2
Nothing	203	22
Don't know	20	2
Total	941	100

Source: ORCI for NREL (2000a), Study #709318, N=941.

Q2.4.4: In order to make our country less dependent on oil from insecure regions in the world, citizens like you could help by reducing the amount of fuel your vehicle consumes by one gallon per week. Which one of the following would you **most** likely do to save one gallon of fuel per week?

Table 2.4.4. Public Preference for Saving One Gallon of Fuel per Week

Actions to Save One Gallon of Fuel Per Week	Number	Percent
Any (net)	569	57
Use mass transit or carpool to get to work	283	28
Purchase a vehicle that gets ten percent better fuel economy than the one you currently drive	180	18
Work at home one or two days per week by telecommuting	106	11
Would do something else to reduce fuel consumption	283	28
Not interested in saving one gallon of fuel per week	33	3
Don't drive/don't have a car	60	6
Don't know	55	5
Total	1,000	99

Source: ORCI for NREL (2001b), Study #710449, N=1,000.

Q2.4.5: What would you do to save fuel?

Table 2.4.5. Possible Actions Taken by Individuals to Reduce Fuel Consumption

Possible Actions by to Reduce Fuel Consumption	Number	Percent
Drive less (net)	126	45
Drive less	38	13
Consolidate trips	24	8
Run fewer errands/trips	19	7
Drive only when necessary/reduce needless travel	10	3
Travel less	10	3
Less weekend/pleasure driving	14	4
All other drive less mentions	12	4
Walk (net)	46	16
Walk (unspecified)	33	12
Walk to work	8	3
All other walk mentions	5	2
Stay home (net)	24	8
Stay home more often	10	3
All other stay home mentions	14	5
Ride bike	11	4
Keep car tuned up/maintained properly	8	3
Other	34	12
Don't know	34	12
Total	283	100

Source: ORCI for NREL (2001b), Study #710449, N=283.

Q2.4.6: Here are some things that can be done to deal with the energy situation. For each one, please say whether you generally favor or oppose it. How about...?

Table 2.4.6. Public Perception of Ways to Deal with the Energy Situation

Ways to Deal with the Energy Situation	Favor (%)	Oppose (%)	No Opinion (%)	Total (%)
Investments in new sources of energy such as solar, wind and fuel cells	91	6	3	100
Mandating more energy-efficient appliances such as air conditioning, clothes dryers, water heaters	87	12	1	100
Mandating more energy-efficient new buildings	86	12	2	100
Mandating more energy-efficient cars	85	14	1	100
Investing in new power generating plants	83	13	4	100
Federal government partnership with auto industry working toward energy-efficient cars	76	22	2	100
Investing in more electrical transmission lines	69	23	8	100
Investing in more gas pipelines	64	29	7	100
Drilling for natural gas on federal lands	63	33	4	100
Increasing the use of nuclear power as a major source of power	48	44	8	100
Opening up the Alaskan Arctic Wildlife Refuge for oil exploration	38	57	5	100

Source: Gallup Poll (2001b), N=505.

Q2.4.7: Here are several proposals that have been made to help solve America's energy problems. Do you favor or oppose each one?

Table 2.4.7. Public Perception of Ways to Deal with the Energy Situation

Ways to Deal with the Energy Situation	Favor (%)	Oppose (%)	No Opinion (%)	Total (%)
Require automakers to produce more fuel-efficient cars	87	10	3	100
Financial incentives for business, consumers to conserve energy	85	12	3	100
Make permitting and building new power plants easier	69	24	7	100
Place federal price controls on gasoline	56	38	6	100
Place federal price controls on electricity and natural gas	54	41	5	100
Place mandatory conservation regulations on businesses and consumers	53	42	5	100
Allow drilling for oil, gas in Alaskan Arctic National Wildlife Refuge	43	50	7	100
Relax clean air, environmental standards	30	65	5	100

Source: NBC/*Wall Street Journal*, June 23–25, 2001, N=806.

Q2.4.8: For U.S. energy needs, do you support or oppose Federal Government action to...?

Table 2.4.8. Public Support of Federal Government Actions for U.S. Energy Needs

Federal Government Actions For U.S. Energy Needs	Support (%)	Oppose (%)	No Opinion (%)	Total (%)
Develop more solar and wind power	90	8	2	100
Encourage more energy conservation by businesses and industries	90	8	2	100
Encourage more energy conservation by consumers like yourself	90	8	2	100
Require car manufacturers to improve fuel efficiency of vehicles sold in the United States	89	10	1	100
Increase oil and gas drilling	67	29	4	100
Build more power plants that burn oil, coal or natural gas	62	31	7	100
Increase coal mining	54	39	7	100
Build more nuclear power plants	46	51	3	100

Source: ABC News/*Washington Post*, May 31–June 3, 2001, N=1,004.

Q2.4.9: Which one should be the Federal Government highest priority?

Table 2.4.9. Public Perception of the Federal Government's Highest Priority

Federal Government Highest Priority	Percent
Develop more solar and wind power	23
Require car manufacturers to improve fuel efficiency of vehicles sold in the United States	19
Encourage more energy conservation by businesses and industries	17
Increase oil and gas drilling	11
Build more power plants that burn oil, coal or natural gas	10
Encourage more energy conservation by consumers like yourself	8
Build more nuclear power plants	8
Increase coal mining	1
Total	97

Source: ABC News/*Washington Post*, May 31–June 3, 2001, N=1,004.

Q2.4.10: Would you favor or oppose legislation that would require manufacturers to improve gas mileage?

Table 2.4.10. Public's Support for Fuel-Efficiency Legislation

	Percent
Favor	79
Oppose	16
Not sure	4

Source: Christian Science Monitor/TIPP (2001) N=936.

Q2.4.11: If it became important for the United States to reduce dependence on imported oil, which of the following policies would you **most** support?

If it became important for the United States to reduce dependence on imported oil, which of the following policies would you **least** support?

Table 2.4.11. Policies the Public Would Most/Least Support to Reduce Dependence on Imported Oil

Policies To Reduce Dependence On Imported Oil	Most Support		Least Support	
	Number	Percent	Number	Percent
Regulation to make personal vehicles more efficient	455	48	145	15
Tax refunds for higher efficiency vehicles	223	24	134	14
Higher taxes on less efficient vehicles	101	11	174	19
Higher taxes on gasoline and diesel	58	6	418	44
Don't know/none of these	104	11	69	7
Total	941	100	940	99

Source: ORCI for NREL (2001a), Study #710148, N=941.

3. GLOBAL WARMING

A number of surveys researched the U.S. population's awareness of global warming. In general, the public is well aware of global warming; however, concern about the long-term impacts is on the decline. Over two-thirds of the adult population perceived the global warming threat as serious in 1996 and 1997 (Table 3.1.1, 3.1.2), but by 2003, only one-third (33%) agreed that global warming posed a serious threat. Nearly 70% believe that the effects of global warming either have begun or will begin within their lifetime. U.S. adults assess global warming as the third (of the five given choices) most important transportation problem to the United States in the year of 2020, following traffic congestion and availability and/or price of gasoline (Table 3.1.4).

An overwhelming majority of Americans support taking actions that incur costs in order to combat global warming. When asked about a policy to reduce greenhouse gas emissions from vehicles, an overwhelming majority of U.S. adults would prefer a 3 percent tax for new vehicles rather than a 25-cent per gallon tax on gasoline (Table 3.2.2).

3.1 PUBLIC AWARENESS AND PERCEIVED SERIOUSNESS OF THE GLOBAL WARMING ISSUE

Q3.1.1: SEBC: In your mind, how serious a threat do you think global climate change, also known as global warming, caused by emissions from the combustion of oil, gasoline, and coal is?

WWF: Generally speaking, how serious of a threat do you think global warming is today: very serious, somewhat serious, not too serious, or not serious at all or don't you have an opinion on this?

Table 3.1.1. Perceived Seriousness of Global Warming Threat

Degree of Seriousness	SEBC (%)	WWF (%)
Very serious	36	24
Somewhat serious	35	42
Not too serious	16	12
Not serious at all	9	7
Don't know	4	14
Total	100	99

Sources: Sustainable Energy Budget Coalition (1996), and World Wildlife Fund National Survey (1997).

Q3.1.2 Do you think that global warming will pose a serious threat to you or your way of life in your lifetime?

Table 3.1.2.1 Perceived Seriousness of Global Warming Threat

	Percent
Yes	33
No	65
No Opinion	2

Source: Gallup (2002b) N=1,006.

Table 3.1.2.2 Extent to which Americans Worry about Global Warming

	April 2000 (%)	March 2001 (%)	March 2002 (%)	March 2003 (%)
A great deal	40	33	29	28
A fair amount	32	30	29	30
Only a little or not at all	27	35	40	40
No Opinion	1	2	2	2

Source: Gallup (2001c) N=1,060; (2002b) N=1,006; (2003b) N=1,003.

Q3.1.3: Which of the following statements reflects your view of when the effects of global warming will begin to happen?

Table 3.1.3. When the Effects of Global Warming Will Begin to Happen

Global Warming Will Begin	Percent
Already begun	51
Within a few years	6
Within your lifetime	12
Not within lifetime, but will affect future	17
Will never happen	10
No Opinion	2

Source: Gallup (2003b) N=1,003.

Q3.1.4: Thinking about the future, which of the following transportation problems will be **most** important to the United States in the year 2020?

Table 3.1.4. Public Ranking of the Most Important Transportation Problem for the United States in the Year 2020

Most Important Transportation Problem	Number	Percent
Traffic congestion	339	34
Availability and/or price of gasoline	282	28
Global warming or climate change caused by vehicles	140	14
Local air pollution from vehicles	122	12
Deaths and serious injuries in vehicle accidents	74	7
Don't know	42	4
Total	999	99

Source: ORCI for NREL, (2000b), Study #709489, N=1,000.

3.2 PERCEIVED ACTIONS TO ADDRESS GLOBAL WARMING

Q3.2.1: There is a controversy over what the countries of the world, including the United States, should do about the problem of global warming. I am going to read you three statements. Please, tell me which statement comes closest to your point of view.

Table 3.2.1. Public Support for Actions to Address Global Warming

Action to Address Global Warming	February–April 1998 (%)	October 1998 (%)	November 2000 (%)
Until we are sure that global warming is really a problem, we should not take any steps that would have economic costs.	15	15	19
The problem of global warming should be addressed, but its effects will be gradual, so we can deal with the problem gradually by taking steps that are low in cost.	44	42	39
Global warming is a serious and pressing problem. We should begin taking steps now even if this involves significant costs.	39	41	39
Don't know/refused	2	2	3
Total	100	100	100

Source: PIPA (1998a), N=600 and PIPA (1998b), N=800, PIPA (2000), N=800.

Q3.2.2: If the nation determines that it is important to reduce greenhouse gas emissions from vehicles, which of the following policies would you prefer?

Table 3.2.2.1 Public Preference for Policy to Reduce Greenhouse Gas Emissions from Vehicles

Policy to Reduce Greenhouse Gas Emissions from Vehicles	Number	Percent
25-cent per gallon tax on gasoline	171	17
3% tax for new vehicles	700	70
Don't know/none of these	129	13
Total	1,000	100

Source: ORCI for NREL (1998a), Study #707089, N=1,000.

Table 3.2.2.2 Public Willingness to Pay More for Gasoline to Reduce Global Warming

	Percent
Would pay 5 cents more per gallon of gasoline if it would reduce global warming	73
Would pay 25 cents more per gallon of gasoline if it would reduce global warming	60
Favor increasing the tax on gasoline by 10 cents per gallon	48

Source: PIPA, 2000, Pew, 1997, and Mellman Group, 1997.

4. ALTERNATIVE FUELS

A number of surveys researched the U.S. adult population knowledge and opinions about alternative types of fuel such as electricity, ethanol, and hydrogen. In 1998, U.S. adults thought that electricity followed by solar energy would most likely replace gasoline and diesel in the future (Table 4.1.1.1). Similar to this finding, in 2000, Americans chose electricity over ethanol and hydrogen as the best fuel to use in personal vehicles when gasoline is no longer available (Table 4.1.2). They chose electricity because of environmental concerns (such as electricity being cleaner and less polluting), and its availability (Table 4.1.3).

Those Americans who preferred ethanol to electricity and hydrogen as the best fuel to use when gasoline is no longer available referred to its availability as one of the primary reasons (Table 4.1.4). Those who selected hydrogen as the best fuel to use in personal vehicles in the future also explained their choice by hydrogen's availability, along with environmental concerns (Table 4.1.5).

The same survey addressed the issue of the worst fuel to use in personal vehicles when gasoline is no longer available. Almost three in ten Americans chose ethanol over electricity and hydrogen as the worst fuel for use in the future because of environmental concerns (Tables 4.1.6). People who rated hydrogen as the worst fuel to use when gasoline is no longer available did so mainly because of safety concerns, such as hydrogen being explosive, flammable/combustible and dangerous/not safe (Table 4.1.7). Those who selected electricity as the worst fuel to use in the future cited electricity being expensive, and environmental concerns (Table 4.1.8). In addition, the U.S. public complained that electric vehicles could not hold a charge for long and, therefore, could not travel long distances.

A recent 2003 poll conducted by HarrisInteractive revealed that 85% of Americans were willing to try a new hydrogen-based technology to power their vehicles and that 43% were "extremely willing" or "very willing". However, Americans are more divided over whether or not they would pay more for a new alternative fuel. Less than half (44%) said that they were willing to pay between two and five times more than they pay now for gasoline. The majority also believe that federal or state governments should help pay for at least part of the new hydrogen-based technology.

Q4.1.1: What fuel will most likely replace gasoline and diesel when they become too expensive to use in cars and trucks? Any others?

Table 4.1.1.1 Public Perception of Which Fuel Will Replace Gasoline and Diesel

Fuel	Number	Percent
Electricity/battery	332	33
Solar	123	12
Alcohol/ethanol/methanol	102	11
Natural gas/CNG/LNG	61	6
Hydrogen	26	3
Propane (LPG)	23	2
Water, nuclear	25	3
Other	54	4
Don't know/none	253	25
Total	1,000	99

Source: ORCI for NREL (1998b), Study #707349, N=1,000. CNG, Compressed Natural Gas; LNG, Liquefied Natural Gas; LPG, Liquid Propane Gas.

Table 4.1.1.2 Factors Considered “Extremely Important “ or “Very Important” in Influencing Decisions to Try a New Fuel Technology

Factor	Percent
How safe the fuel is for drivers and passengers	83
The cost of the fuel	78
How far you can drive before refueling	75
The cost of the vehicle	72
The convenience of refueling	67
Environmental emissions	67
Whether the fuel source is domestic instead of foreign	47
How the new fuel system affects passenger and cargo space	47
Whether or not the fuel can be recycled	45

Source: Harris poll for Millennium Cell and U.S. Borax, Inc. (2003) N=1,006.

Public Perceptions of Best Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Q4.1.2: Consider a future date when gasoline is no longer available. Which of the following do you think would be the **best** fuel for use in personal vehicles: electricity, ethanol, or hydrogen?

Table 4.1.2. Public Perception of Best Fuel and Worst Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Fuel for Use in Personal Vehicles	Best Fuel		Worst Fuel	
	Number	Percent	Number	Percent
Electricity	522	52	150	15
Ethanol	206	21	281	28
Hydrogen	151	15	274	27
Don't know	121	12	295	30
Total	1,000	100	1,000	100

Source: ORCI for NREL (2000b), Study #709489*, N=1,000.

* The ORCI study # 709489 was conducted before the electricity problems in California

Q4.1.3: Why did you say **electricity** would be the **best** fuel for use in personal vehicles when gasoline is no longer available?

Table 4.1.3. Reasons **Electricity** Would Be the **Best** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE ¹		NC ¹		S ¹		W ¹	
			n	%	n	%	n	%	n	%
Environmental concerns (net)	153	29	36	32	29	28	48	25	40	35
Cleaner	73	14	19	17	16	15	20	10	18	16
Does not pollute/less pollution	50	10	9	8	10	9	20	10	11	10
Less air pollution/cleaner air	24	5	8	7	1	1	7	4	8	7
All other environmental concerns mentions	24	5	4	3	6	6	6	4	8	8
Availability (net)	117	22	28	25	25	24	40	21	23	20
Common/readily available/abundant	64	12	13	11	15	14	23	12	14	12
Renewable/inexhaustible	25	5	7	6	6	6	9	5	3	3
Easy to produce/manufacture/can generate our own fuel/not dependent on foreign sources	18	3	7	6	1	1	7	3	3	2
All other availability mentions	15	3	3	3	4	3	5	2	4	3
Existing/developing technology (net)	88	17	21	19	19	18	30	16	18	16
This technology is already being developed/used	34	6	8	7	7	7	12	6	6	6
Electric cars are already being developed	33	6	8	7	7	7	11	6	7	6
Many/more and more things are powered by electric/all other existing/ developing technology mentions	21	4	4	4	4	4	7	4	5	5

Reasons	Total		Region							
	n	%	NE ¹		NC ¹		S ¹		W ¹	
			n	%	n	%	n	%	n	%
Economical/affordable	58	11	11	10	11	11	24	12	12	11
Methods of generating (net)	38	7	5	4	8	8	16	8	10	8
Can be solar generated/powered	26	5	2	2	6	5	10	5	8	7
All other methods of generating mentions	12	3	2	2	2	2	6	3	1	1
Most familiar with it/not familiar with others	38	7	9	8	10	10	12	6	7	6
Safety concerns (net)	26	5	8	7	3	3	10	5	4	4
Best source (unspecified)	19	4	7	6	2	2	6	3	4	3
More efficient	17	3	3	3	4	4	4	2	6	5
Easier/convenient (unspecified)	16	3	6	6	2	2	7	4	small base	small base
Others not practical /performance concerns	15	3	3	3	small base	small base	6	3	5	5
Other	24	5	4	4	4	3	10	5	7	6
Don't know	34	6	4	4	10	10	15	8	4	3

Source: ORCI for NREL (2000b), Study #709489, N=522.

¹In this report the following abbreviations stand for:

NE – Northeast region

NC – North-Central region

S – South Region

W – West Region

Q4.1.4: Why did you say **ethanol** would be the **best** fuel for use in personal vehicles when gasoline is no longer available?

Table 4.1.4. Reasons **Ethanol** Would Be the **Best** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Availability (net)	55	27	8	27	20	28	15	22	12	30
Common/readily available/abundant	23	11	2	6	10	14	10	15	2	5
Renewable/inexhaustible	14	7	3	10	3	4	4	6	4	10
Easy to produce/manufacture	11	5	3	10	4	5	2	3	3	7
Can generate our own fuel/not dependent on foreign sources	6	3	1	2	3	4	1	1	1	3
All other availability mentions	3	2	0	0	small base	1	1	1	2	5
Methods of generating (net)	38	18	3	10	17	24	11	17	7	17
Made from corn/grain	34	16	2	7	17	24	9	14	6	14
All other methods of generation mentions	4	2	1	3	0	0	2	3	1	3
Economical/affordable	32	15	6	21	9	12	9	13	9	21
Environmental concerns (net)	31	15	7	23	11	15	8	13	5	13
Cleaner	19	9	6	20	7	10	3	5	3	6
Does not pollute/less pollution	6	3	0	0	3	4	1	2	3	7
All other environmental concerns mentions	7	4	0	0	2	3	4	6	0	0
Others not practical/ performance concerns	21	10	1	3	6	8	9	14	5	13
Better for/helps farmers/ farming industry	16	8	0	0	9	14	4	7	2	5
Existing/developing technology (net)	16	8	0	0	6	9	6	10	3	7
This technology is already being developed/used	16	8	0	0	6	9	6	10	3	7
Best source (unspecified)	11	5	2	5	4	6	1	2	4	10
More similar to gasoline	10	5	3	9	3	4	2	3	2	5

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Other	25	12	8	24	4	6	8	13	5	13
Don't know	15	7	0	0	5	7	8	13	1	3

Source: ORCI for NREL (2000b), Study #709489, N=206.

Q4.1.5: Why did you say **hydrogen** would be the **best** fuel for use in personal vehicles when gasoline is no longer available?

Table 4.1.5. Reasons **Hydrogen** Would Be the **Best** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Availability (net)	56	37	9	35	14	40	19	38	14	35
Common/readily available/abundant	41	27	8	30	10	31	14	28	9	21
Easy to produce/manufacture	10	7	2	6	5	14	2	4	2	5
Renewable/inexhaustible	7	5	0	0	0	0	4	8	3	8
All other availability mentions	5	3	1	5	2	4	0	0	3	5
Environmental concerns (net)	40	27	7	26	10	29	15	30	9	22
Cleaner	26	17	4	14	5	15	10	20	7	18
Does not pollute/less pollution	10	7	2	9	3	9	2	5	2	6
All other environmental concerns mentions	5	4	1	3	2	4	2	5	0	0
Methods of generating (net)	21	14	5	21	6	17	8	17	1	3
Can be generated by/derived from water	20	13	5	17	6	17	8	17	1	3
Economical/affordable	18	12	3	12	5	15	6	12	4	10
Others not practical/performance concerns	17	11	5	19	4	13	4	8	3	8
Existing/developing technology (net)	10	7	2	7	2	4	3	6	4	9
This technology is already being developed/used	10	7	2	7	2	4	3	6	4	9
More efficient	8	5	1	5	0	0	3	7	3	8
Safety concerns	8	5	1	5	1	2	1	3	4	10
Best source (unspecified)	4	3	1	4	--	1	1	2	2	4
Other	13	9	1	5	4	13	2	4	6	14
Don't know	13	9	1	4	1	3	8	15	4	9

Source: ORCI for NREL (2000b), Study #709489, N=151.

Q4.1.6: Why did you say **ethanol** would be the **worst** fuel for use in personal vehicles when gasoline is no longer available?

Table 4.1.6. Reasons **Ethanol** Would Be the **Worst** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Environmental concerns (net)	106	38	21	41	25	43	35	33	26	38
Pollution (subnet)	84	30	16	32	20	34	28	26	21	31
Produces pollution	46	16	9	18	9	16	21	20	7	10
Causes air pollution	27	10	5	10	7	12	5	5	9	14
All other pollution mentions	14	5	4	8	3	6	1	1	5	7
Creates environmental problems	9	3	1	2	2	4	4	4	1	1
All other environmental concerns mentions	17	6	3	7	4	6	5	5	6	8
Safety concerns (net)	56	20	17	34	12	21	17	17	10	14
Flammable/combustible	11	4	3	6	1	2	4	4	3	4
Explosive	7	3	2	4	1	2	4	4	0	0
Contains chemicals	7	3	3	7	1	2	1	1	2	3
All other safety concerns mentions	32	12	9	17	9	16	8	8	5	8
Expense (net)	17	6	0	0	6	10	4	4	6	10
Too expensive	16	6	0	0	6	10	4	4	6	8
Lack of availability	10	4	2	5	3	4	3	3	2	3
Finite/exhaustible resource	8	3	2	4	0	0	2	2	3	5
Difficult to produce	8	3	1	2	2	3	3	3	1	2
Causes engine trouble	7	3	0	0	3	6	3	3	1	2
Other	38	13	4	10	9	16	11	11	12	20
Don't know	58	20	10	21	7	12	31	29	10	15

Source: ORCI for NREL (2000b), Study #709489, N=281.

Q4.1.7: Why did you say **hydrogen** would be the **worst** fuel for use in personal vehicles when gasoline is no longer available?

Table 4.1.7. Reasons **Hydrogen** Would Be the **Worst** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Safety concerns (net)	137	50	30	59	31	44	49	48	26	53
Explosive	39	14	9	17	6	9	17	17	7	15
Flammable/combustible	38	14	9	18	8	12	13	13	7	14
Dangerous/not safe (unspecified)	28	10	5	10	6	9	12	11	5	10
Unstable	14	5	4	8	3	5	2	2	4	8
Think of bombs	8	3	2	4	2	3	3	2	1	2
All other safety concerns mentions	24	9	2	4	10	14	5	5	5	11
Pollution and environmental concerns (net)	21	8	4	8	3	4	10	10	4	9
Not enough is known about it	10	4	1	2	3	5	3	3	3	6
Difficult to produce	10	4	2	5	3	4	5	5	0	0
Too expensive	8	3	0	0	2	2	4	4	2	4
Other	41	15	8	15	11	16	18	17	5	10
Don't know	57	21	9	17	20	28	19	19	9	18

Source: ORCI for NREL (2000b), Study #709489, N=274.

Q4.1.8: Why did you say **electricity** would be the **worst** fuel for use in personal vehicles when gasoline is no longer available?

Table 4.1.8. Reasons **Electricity** Would Be the **Worst** Fuel for Use in Personal Vehicles When Gasoline Is No Longer Available

Reasons	Total		Region							
	n	%	NE		NC		S		W	
			n	%	n	%	n	%	n	%
Too Expensive	42	28	13	37	12	31	8	17	10	30
Electric vehicles can't hold charge for long/can't travel long distances	30	20	4	11	9	23	11	25	6	19
Environmental concerns (net)	29	19	7	21	7	18	7	16	8	24
Must burn coal/fossil fuels to generate electricity	18	12	4	12	6	15	4	8	5	14
Pollution	8	6	4	11	2	6	2	6	0	0
All other environmental concerns mentions	9	6	1	4	0	0	5	10	3	10
Not enough electricity now	17	12	6	16	3	7	6	14	3	8
Safety concerns	8	5	1	3	2	5	3	6	2	7
Other	21	15	4	12	7	17	7	16	2	12
Don't know	15	10	3	8	4	10	6	13	3	8

Source: ORCI for NREL (2000b), Study #709489, N=150.

5. CONVENTIONAL, MORE FUEL-EFFICIENT, AND ADVANCED TECHNOLOGY VEHICLES

Section 5 focuses on vehicle owners and the decisions they make about their vehicles. It consists of three sections that encompass survey data on owners' decisions about their conventional (i.e., gasoline) vehicles, as well as more fuel-efficient and advanced technology vehicles.

5.1 VEHICLE OWNERS' DECISIONS ABOUT CONVENTIONAL VEHICLES

Surveys revealed that one out of five adults plan to keep his/her vehicle for 5 years (Table 5.1.1). On average, Americans expect to keep their vehicles for almost 7 years (Table 5.1.2). An overwhelming majority of Americans bought, rather than leased, their current vehicles, and almost one in two adults purchased their vehicles used. Only 7 percent of respondents reported leasing their current vehicles. Adults who leased vehicles tended to lease them new (Table 5.1.2). More than one out of four U.S. adults purchased their current vehicles in order to replace vehicles that had a lot of mileage, or ones that required expensive or frequent repairs (Table 5.1.3).

In the J.D. Power and Associates 2003 Initial Quality Study released in May, fuel consumption was the second most common driver complaint. In the 17 years of the annual survey, this was the highest ranking for fuel consumption ever. It had never before cracked the top five. Fuel economy generally has ranked far down on buyers' priority list, according to auto industry's market research. However, it seems to have increased importance after customers bought their vehicles, as the level of fuel consumption complaints doubled, according to a New York Times article.

In the year 2000, the public valued dependability more than safety, followed by quality. In 2001, Americans valued vehicle safety as much as dependability followed by vehicle quality, fuel economy, and low vehicle price (Table 5.1.4). Over the years since 1981, vehicle users reported dependability as the most important attribute in their choice of a new vehicle. Americans valued vehicle price after dependability from 1981 until 1987. Since 1996, safety became the second most important attribute (after dependability) when buying a new vehicle. With respect to safety, an overwhelming majority do not believe that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size (Table 5.1.5).

In line with the fact that lately Americans consider safety one of the most valuable vehicle attributes and that the larger the vehicle the safer it is expected to be, is the fact that the highest-selling vehicles in the United States currently are large vehicles such as pickup trucks, minivans, and sport utility vehicles (*The Washington Post*, 2001). In 1998, almost half of those vehicle owners who were likely to purchase the above-mentioned large vehicles planned on buying a towing package for the new vehicle (Table 5.1.6). In addition, about one-third of these vehicle owners planned on using their new pickup truck, minivan, standard van, or sport utility vehicle off-road (Table 5.1.7). The top reasons for not buying or not considering the purchase of an SUV included high fuel costs and concerns about safety/rollovers (Table 5.1.9)

When they dispose of their current vehicles, almost one out of two Americans will buy a new vehicle, two out of five will buy a used vehicle, and the remainder will lease (Table 5.1.10). This finding is consistent with survey results from 1998 when almost as many reported a preference for buying new vehicles as those who would rather purchase used ones (Table 5.1.11). In 1998, a majority of those Americans who were likely to purchase a new vehicle would plan on spending \$10,000 – \$25,000 on this new vehicle. More than one in four U.S. adults planned to spend \$15,000 –\$20,000 (Table 5.1.8). When asked about a dollar amount increase in new vehicle prices that would make them purchase a used vehicle instead of the new one, almost one in two adults mentioned more than \$2,000 (Table 5.1.12).

Of those who valued certain new vehicle attributes or improvements, they were willing to pay the following, on average (Table 5.1.13):

- a. Emergency electricity for home-- \$940
- b. Use of HOV or carpool lanes-- \$540
- c. 50% quieter than conventional vehicle-- \$890
- d. Electrical outlet to run electronics or small appliances-- \$800

Q5.1.1: From the day you acquired the vehicle you currently drive, how many years total do you plan on keeping it?

Table 5.1.1. Total Number of Years Individuals Plan to Keep Their Vehicle

Number of Years	Number	Percent
1–5 years (net)	461	50
1	35	4
2	78	8
3	97	11
4	68	7
5	182	20
6–10	267	29
11–15	51	6
16–20	51	6
Don't know	91	10
Total	920	101
Mean¹	6.9	

Source: ORCI for NREL (2000c), Study #709089, N=920.

¹ In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don’t know” responses are not part of the calculations.

Q5.1.2: How did you acquire the vehicle you currently drive: purchase, lease, gift?

Table 5.1.2. Vehicle Acquisition Data

Acquisition Method	Number	Percent
Purchased (net)	783	85
Purchased new	333	36
Purchased used	449	49
Leased (net)	66	7
Leased new	54	6
Leased used	12	1
Gift	60	7
Other/don't know	12	1
Total	920	100

Source: ORCI for NREL (2000c), Study #709089, N=920.

Q5.1.3: What was the primary reason you acquired the vehicle that you currently drive?

Table 5.1.3.1 Primary Reason for Acquiring Current Vehicle

Primary Reason	Number	Percent
Replaced a vehicle that had a lot of mileage on it or one that required expensive or frequent repairs	247	27
Wanted a newer vehicle	209	23
Wanted/needed a different size or type of vehicle	200	22
Replaced a vehicle that was damaged in an accident or was stolen	79	9
First vehicle	63	7
Reached end of previous lease	25	3
Other/don't know	97	11
Total	920	102

Source: ORCI for NREL (2000c), Study #709089, N=920.

Table 5.1.3.2 Percentage of In-Market Buyers Saying They Would Consider Purchasing an SUV

	January 2003	March 2003
Would consider	42	37
Would not consider	58	63

Source: Kelley Blue Book (2003).

Q5.1.4: Which of the following attributes would be MOST important to you in your choice of your next vehicle? (Aided)

Table 5.1.4. Trends in Vehicle Attribute Preference, Selected Years 1980–2001

Attributes	1980 (%)	1981 (%)	1983 (%)	1985 (%)	1987 (%)	1996 (%)	1998 (%)	2000 (%)	2001 (%)
Fuel economy	42	20	13	8	4	7	4	10	10
Dependability	31	40	38	41	44	34	36	32	29
Low price	14	21	30	29	31	11	5	11	8
Quality	4	7	11	12	8	19	20	21	22
Safety	9	12	9	10	14	29	34	24	29
Don't know/ none of these							1	2	1
Total	100	100	100	100	101	100	100	100	99

Sources: For 1980s: J. D. Power (data based on new car buyers). For 1996: ORCI for NREL. For 1998: ORCI for NREL (1998a), N = 1,000. For 2000: ORCI for NREL (2000a), N = 941. For 2001: ORCI for NREL (2001c), N = 989.

Q5.1.5: Do you think that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size?

Table 5.1.5. Public Perception of Vehicle Size vs. Safety

Vehicle Size as a Safety Issue	Total		Type of New Vehicle Will Purchase Next									
	n	%	Small Car		Large Car		Minivan		SUV		Pickup Truck/Van	
			n	%	n	%	n	%	n	%	n	%
Believe that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size.	119	12	23	15	16	7	13	19	27	15	24	13
Do not believe that a lighter vehicle is as safe in traffic accidents as a heavier one of the same size	824	82	127	81	193	89	52	75	136	78	156	82
Don't know	57	6	8	5	7	3	4	6	11	6	10	5
Total	1000	100	158	101	216	99	69	100	174	99	190	100

Source: ORCI for NREL (1999b), Study #70844, N=1,000.

Q5.1.6: You mentioned that you would plan to buy a pickup truck, minivan, standard van, or sport utility vehicle. Would you plan to purchase a towing package for this new vehicle?

Table 5.1.6. Towing Package Preference for a New Vehicle

Plans on Purchasing or Not Purchasing a Towing Package	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup Truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
Plan on buying a towing package	208	47	0	0	0	0	0	0	85	52	6	33	25	32	91	51
Do not plan on buying a towing package	225	51	0	0	0	0	0	0	77	47	13	67	52	66	83	47
Don't know	6	1	0	0	0	0	0	0	2	1	0	0	1	2	3	2
Total	439	99	0	0	0	0	0	0	164	100	19	100	78	100	177	100

Source: ORCI for NREL (1998a), Study #707089, N=439.

Q5.1.7: You mentioned that you would plan to buy a pickup truck, minivan, standard van, or sport utility vehicle. Would you plan to use it off road?

Table 5.1.7. Expected Off-Road Use of a New Vehicle

Plans on Using Or Not Using Off-Road	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
Plan on using off road	163	37	0	0	0	0	0	0	77	47	3	16	6	8	76	43
Do not plan on using off road	270	62	0	0	0	0	0	0	85	52	16	84	71	91	97	55
Don't know	6	1	0	0	0	0	0	0	2	1	0	0	1	1	4	2
Total	439	100	0	0	0	0	0	0	164	100	18	100	78	100	177	100

Source: ORCI for NREL (1998a), Study #707089, N=439.

Q5.1.8: How much would you plan on paying for a new vehicle?

Table 5.1.8. Expected Expenditure for a New Vehicle

Expected Expenditure for a New Vehicle	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsize Car		Large Car		Pickup truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
\$5,000 or less	35	4	5	5	13	4	4	4	4	3	1	6	4	6	3	1
\$5,001–\$10,000	61	6	17	18	28	8	5	5	5	3	1	6	3	4	1	1
\$10,001–\$15,000	179	19	36	39	89	27	1	1	30	19	3	16	10	12	10	6
\$15,001–\$20,000	259	27	21	23	102	31	11	12	56	34	7	35	30	38	32	18
\$20,001–\$25,000	178	19	5	5	49	15	23	24	34	21	2	11	16	20	50	28
\$25,001–\$30,000	127	13	2	2	19	6	20	21	22	13	2	13	11	14	52	30
More than \$30,000	70	7	1	1	11	3	26	27	7	4	3	13	2	2	21	12
Don't know	50	5	7	7	23	7	4	4	5	3	0	0	3	4	8	4
Total	959	100	94	100	334	101	94	98	163	100	19	100	79	100	177	100
Mean¹	\$20,650		\$14,494		\$18,022		\$27,513		\$20,427		\$21,003		\$19,487		\$25,662	

Source: ORCI for NREL (1998a), Study #707089, N=959.

¹ In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don’t know” responses are not part of the calculations.

Q5.1.9 A new poll of in-market car buyers reveals views towards sport utility vehicles (SUVs).

Table 5.1.9.1 Issue is a Major Reason for Those NOT Considering the Purchase of an SUV

Issue	January 2003	March 2003
Price of gas	--	50
Not the kind of vehicle I want	51	45
Rollover/ safety concerns	30	34
Impact on foreign oil dependence	28	31
Impact on environment	25	26
Too big for the road	23	23

Source: Kelley Blue Book (2003).

Table 5.1.9.2 Issue that Could Keep Potential Buyer from Purchasing an SUV

Issue	January 2003	March 2003
Rollover/ safety concerns	44	38
Price of gas	--	42
Too big for the road	20	20
Impact on foreign oil dependence	19	22
Impact on environment	12	20

Source: Kelley Blue Book (2003).

Q5.1.10: When you dispose of your current vehicle, how will you most likely replace it: buy a new vehicle, buy a used vehicle, lease a new vehicle, or lease a used vehicle?

Table 5.1.10. Current Vehicle Replacement Methods

Method to Replace Vehicle	Number	Percent
Any (net)	819	89
Buy (subnet)	773	84
Buy a new vehicle	422	46
Buy a used vehicle	351	38
Lease (subnet)	46	5
Lease a new vehicle	42	5
Lease a used vehicle	4	small base
Won't replace It	57	6
Receive a donated vehicle/gift/other	45	4
Total	921	99

Source: ORCI for NREL (2000c), Study #709089, N=920

Q5.1.11: Will the next vehicle you purchase be new or used?

Table 5.1.11. Public Preference for Purchasing New or Used Vehicles

Type of Vehicle	Total		Type of New Vehicle Most likely to Buy													
	n	%	Small Car		Midsized Car		Large Car		Pickup truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
New vehicle	452	45	41	44	158	47	45	48	64	39	9	46	37	46	98	55
Used vehicle	456	46	43	46	147	44	35	38	92	56	10	54	39	50	68	39
Don't plan to purchase vehicle	49	5	6	6	19	6	9	10	3	2	0	0	2	3	1	1
Don't know	43	4	3	4	10	3	5	5	6	3	0	0	1	1	9	5
Total	1,000	100	93	100	334	100	94	101	165	100	19	100	79	100	176	100

Source: ORCI for NREL (1998a), Study #707089, N=1,000.

Q5.1.12: Assuming energy or environmental concerns cause new vehicle prices to increase, how much would new vehicle prices have to increase for you to decide to buy a used vehicle instead of a new vehicle?

Table 5.1.12. Public Perception of the Effect of New Vehicle Price Increases on Purchasing Decisions

Amount of Increase Before Decision to Buy a Used Vehicle	Number	Percent
\$500 or less	38	4
\$501–\$1,000	45	5
\$1,001–\$2,000	84	8
\$2,001–\$5,000	270	27
More than \$5,000	214	21
None	164	16
Don't Know	185	19
Total	1,000	100
Mean¹ (including none)	\$4,109	
Mean¹ (excluding none)	\$5,142	

Source: ORCI for NREL (1998a), Study #707089, N=1,000.

¹ In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don’t know” responses are not part of the calculations.

Q5.1.13: How many extra dollars would you be willing to pay for a new vehicle that would provide each of the following?

Summary of Tables 5.1.13.1-5.1.1.3.5

New Vehicle Attribute	Willing to Pay (%)	Average Amount (\$)
Emergency Back-Up Electricity	51	940
Earn You \$1000 (\$2000 or \$3000) per Year in Sales of Electricity	52	NA
Allow You to Drive in an HOV or Carpool Lane	28	540
50% Quieter than the Conventional Vehicle	42	890
Provide an Electrical Outlet	46	800

Table 5.1.13.1 Public's Willingness to Pay for Vehicle Attributes—
Emergency Back-Up Electricity for Your Home

Amount of Extra Dollars for Back-Up Electricity	Number	Percent
Zero	351	37
\$1 - \$250	172	18
\$251 - \$500	100	10
\$501 - \$1000	106	11
\$1001 - \$2000	62	6
\$2001 - \$4000	28	3
Over \$4000	27	3
Don't know	112	12

Source: ORCI for NREL (2003a) N=958.

Table 5.1.13.2 Public's Willingness to Pay for Vehicle Attributes— Earn You \$1000 (\$2000 or \$3000) per Year in Sales of Electricity to the Local Electricity Company

Amount of Extra Dollars for \$1000 in Annual Electricity Sales	Number	Percent
Zero	265	28
\$1 - \$250	149	16
\$251 - \$500	105	11
\$501 - \$1000	100	10
\$1001 - \$2000	70	7
\$2001 - \$4000	43	4
Over \$4000	34	4
Don't know	193	20

Source: ORCI for NREL (2003a) N=959.

Table 5.1.13.3 Public's Willingness to Pay for Vehicle Attributes— Allow You to Drive in an HOV or Carpool Lane

Amount of Extra Dollars for HOV or Carpool Lane	Number	Percent
Zero	549	57
\$1 - \$250	129	13
\$251 - \$500	47	5
\$501 - \$1000	49	5
\$1001 - \$2000	16	2
\$2001 - \$4000	13	1
Over \$4000	16	2
Don't know	140	15

Source: ORCI for NREL (2003a) N=959.

Table 5.1.13.4 Public's Willingness to Pay for Vehicle Attributes— 50% Quieter than the Conventional Vehicle

Amount of Extra Dollars for Quieter Vehicle	Number	Percent
Zero	447	47
\$1 - \$250	150	16
\$251 - \$500	74	8
\$501 - \$1000	85	9
\$1001 - \$2000	49	5
\$2001 - \$4000	18	2
Over \$4000	26	3
Don't know	110	11

Source: ORCI for NREL (2003a) N=959.

Table 5.1.13.5 Public's Willingness to Pay for Vehicle Attributes—
Provide an Electrical Outlet that Could Run Tools, Power Lights, Operate TV, Etc.

Amount of Extra Dollars for Operating Electrical Devices	Number	Percent
Zero	420	44
\$1 - \$250	210	22
\$251 - \$500	98	10
\$501 - \$1000	59	6
\$1001 - \$2000	34	4
\$2001 - \$4000	19	2
Over \$4000	26	3
Don't know	96	10

Source: ORCI for NREL (2003a) N=962.

5.2 VEHICLE OWNERS' DECISIONS ABOUT MORE FUEL-EFFICIENT VEHICLES

The ORCI surveys revealed that one out of two Americans is interested in having more information about the environmental impacts of new light vehicles (Table 5.2.3). The number of people interested in the *Federal Fuel Economy Guide* rating was split evenly between those who were and those who were not interested in the guide (Table 5.2.1)

A relatively high percentage of the U.S. population who does not consider fuel economy an important issue is consistent with relatively low willingness to purchase a car with better fuel economy. When buying a new vehicle, slightly more than one in four Americans would most likely purchase a lighter car with average acceleration and better fuel economy rather than an average car, i.e., a car with average weight, average acceleration and average fuel economy (Table 5.2.4). By comparison, 62% of those surveyed in the European Union considered fuel economy in their vehicle purchasing decisions (Table 5.2.10). In Sweden, the percentage rises to 75%, the highest of all European countries surveyed.

Among the things that would motivate purchasing a more fuel-efficient vehicle, American adults mentioned cost, features and performance, and gas mileage (Table 5.2.5). With cost being a critical factor in motivating them to purchase a more fuel-efficient vehicle, on average, Americans say they would pay more than \$2,100 additional for a vehicle that gets 10 percent better fuel economy (Table 5.2.6). However, when asked how many years they were willing to wait to recover additional vehicle costs through fuel savings, the average was less than 3 years (Table 5.2.7).

Though Americans would make their decisions on purchasing or not purchasing more fuel-efficient vehicles based on cost, performance, and other considerations rather than on reports presenting proof of fuel efficiency, more than half of U.S. adults had some information or paid some attention to the information on fuel economy when purchasing their current vehicle. They reported finding this information on window stickers, in dealer brochures, magazines, and consumer guides. Though Americans were more likely to get information on fuel economy from sources other than the Government's *Fuel Economy Guide*, more than one in five respondents mentioned seeing a copy of it. Most of them had seen it in a showroom (Table 5.2.9).

Q5.2.1: Would you use the Federal Fuel Economy Guide rating when purchasing a new vehicle?

Table 5.2.1. Public Interest in the Federal Fuel Economy Guide

	Number	Percent
Yes	473	47
No	456	46
Don't know	71	7
Total	1,000	100

Source: ORCI for NREL (2002a), N=1,000.

Q5.2.2: If fuel economy was a factor you considered in your last vehicle purchase, where did you find information on fuel economy?

Table 5.2.2. Location of Fuel Economy Data Used for Last Vehicle Purchase

Location of Fuel Economy Information	Number	Percent
Any (net)	561	56
Window sticker	222	22
Dealer brochures	116	12
Magazines, consumer guide	113	11
Word of mouth	50	5
On the Internet	39	4
Television	23	2
Government's Fuel Economy Guide	6	1
Other	79	8
Fuel economy not an important issue	262	26
Don't know/don't own vehicle	177	18
Total	1,000	100

Source: ORCI for NREL (1999a), Study #70809, N=1,000.

Q5.2.3: On a scale of 1 to 5, where 1 is not interested and 5 is very interested, please indicate your interest in having more information about the environmental impacts of new cars and light trucks?

Table 5.2.3. Public Interest for Additional Information on the Environmental Impacts of New Light Vehicles

Level of Interest	Number	Percent
Very interested	230	23
Moderately interested	143	14
Somewhat interested	254	25
Little interested	92	9
Not interested	265	27
Don't know	16	2
Total	1,000	100

Source: ORCI for NREL (1999a), Study #70809, N=1,000.

Q5.2.4: Some of the things that are important in choosing a new car are power, acceleration time, and fuel economy. Let me tell you a little about the average car and then I will describe some options and ask you to choose the one you are most likely to purchase. I will read all the options first, then will summarize them and ask you to pick one.

The average car accelerates from 0 to 60 miles per hour in about 10.5 seconds and achieves an EPA fuel economy rating of 27.3 miles per gallon. Your options are:

1. The average car.
2. A car that is 10 percent **lighter** with the **same acceleration** performance but a 2 miles per gallon **better fuel economy**, saving about \$4 per month in fuel.
3. A car that is 10 percent **lighter** with the **same fuel economy** but 1.5 seconds **quicker acceleration** time.
4. A car that is 10 percent **heavier** with the **same fuel economy** but about 1.5 seconds **slower acceleration** time.
5. A car that is 10 percent **heavier** with the **same acceleration** performance but a 2 miles per gallon **lower fuel economy**, costing about \$4 more per month in fuel.

Which of these would you most likely purchase?

Table 5.2.4. Public Preference Toward Purchase of Cars with Different Weight, Acceleration and Fuel Economy Parameters

Car	Number	Percent
The average car	55	15
The lighter car with average acceleration and better fuel economy	102	27
The lighter car with average fuel economy and quicker acceleration	63	17
The heavier car with average fuel economy and slower acceleration	76	20
The heavier car with average acceleration and lower fuel economy	59	16
Don't know	18	5
Total	373	100

Source: ORCI for NREL (1999b), Study #70844, N=373

Q5.2.5: For your next vehicle purchase, what would motivate you to purchase a more fuel-efficient vehicle?

Table 5.2.5. Public Perception of Motivation Required to Purchase a More Fuel Efficient Vehicle

Motivation for Purchase of a More Fuel-Efficient Vehicle		Total		Type of New Vehicle Most Likely to Buy													
		n	%	Small Car		Midsize Car		Large Car		Pickup Truck		Standard Van		Minivan		SUV	
				n	%	n	%	n	%	n	%	n	%	n	%	n	%
Cost/savings (net)		428	45	40	43	143	43	42	45	71	43	10	52	31	39	91	52
	Sticker price of vehicle	159	17	7	7	55	16	17	18	24	15	4	20	15	19	37	21
	Lower cost/saves money (general mentions)	130	14	19	20	43	13	11	12	22	13	4	21	11	14	20	11
	Lower cost of fuel	121	13	13	14	40	12	13	14	21	13	2	10	3	4	29	16
	Operating/maintenance costs	25	3	1	1	7	2	3	3	6	4	0	0	3	4	4	2
	All other cost mentions	18	1	3	4	5	1	3	3	1	1	0	0	1	1	5	2
Features/performance (net)		219	23	2	24	77	23	21	22	41	25	4	21	15	19	38	21
	Acceptable emissions control/less pollution	104	11	9	10	37	11	13	14	20	12	0	0	7	8	18	10
	Horsepower/speed	33	3	1	1	8	2	3	3	13	8	0	0	3	4	5	3
	Other features/styles/options offered	99	11	16	16	41	14	7	7	14	9	5	26	8	10	17	11
Gas mileage/fuel efficiency		167	17	16	17	61	18	16	17	33	20	1	7	16	21	24	14
Fuel	Availability of type of fuel needed	46	5	2	2	13	4	5	5	6	4	1	5	5	6	13	8
Other		105	10	14	15	36	10	12	12	20	13	1	4	10	11	15	8
Nothing/not interested		74	8	6	6	27	8	8	8	15	9	2	13	5	6	11	6
Don't know		87	9	8	9	28	9	9	9	13	8	3	14	10	12	16	9

Source: ORCI for NREL (1998a), Study #707089, N=961

Q5.2.6: How much **more** would you be willing to pay for the vehicle that gets ten percent better fuel economy than for the vehicle you currently drive?

Table 5.2.6. Additional Amount the Public is Willing to Pay for a Vehicle with a 10 Percent Increase in Fuel Economy

Dollar Amount	Number	Percent
Less than \$500	13	7
\$500–\$1,000	27	15
\$1,001–\$2,500	31	17
\$2,501–\$5,000	26	15
More than \$5,000	10	5
None	33	18
Don't know	41	23
Total	181	100
Mean¹ (including none)	\$2,143	
Mean¹ (excluding none)	\$2,799	

Source: ORCI for NREL (2001b), Study #710449, N=180.

¹ In this report, calculation of means, medians and standard deviations are based on raw numbers. "Don't know" responses are not part of the calculations.

Q5.2.7: Suppose that the next vehicle you've decided to buy offers an option of better fuel economy, but at a higher price. The savings in fuel costs would pay back the higher price over time. How soon, in years, would the fuel savings have to pay back the additional cost to persuade you to buy the higher fuel economy option?

Table 5.2.7. Number of Years Public is Willing to Accept for Payback of Higher Fuel Economy Vehicle

Years	Number	Percent
1	182	18
2	225	23
3	135	13
4	32	3
5	122	12
6	4	-
More than 6	31	3
Don't Know	268	27
Total	1000	100
Mean	2.9	

Source: ORCI for NREL (2002b), N=1,000.

Q5.2.8: Suppose you have decided to buy a new vehicle and have a choice of an optional engine that requires a new fuel that costs the same as gasoline and is just as good as gasoline.

Version A: The optional engine costs the same as the conventional one but gets 50 percent more miles per gallon. However, the fuel it requires is sold only at 1 in 10 stations. Which would you most likely buy?

Version B: The optional engine costs the same as the conventional one but gets 50 percent more miles per gallon. However, the fuel it requires is sold only at 1 in 5 stations. Which would you most likely buy?

Version C: The optional engine costs the same as the conventional one but gets 50 percent more miles per gallon. However, the fuel it requires is sold only at 1 in 3 stations. Which would you most likely buy?

Table 5.2.8. Public Preference Toward Purchasing a More Fuel-Efficient Engine with Different Fuel Availability Options

Fuel Availability Options	Conventional Engine		Optional Engine		Don't Know/Refused	
	n	%	n	%	n	%
The optional engine costs the same as the conventional one, but gets 50% more miles per gallon. However, the fuel it requires is sold only at 1 in 10 stations.	74	66	33	30	4	4
The optional engine costs the same as the conventional one, but gets 50% more miles per gallon. However, the fuel it requires is sold only at 1 in 5 stations.	69	62	40	36	3	3
The optional engine costs the same as the conventional one, but gets 50% more miles per gallon. However, the fuel it requires is sold only at 1 in 3 stations.	48	43	59	53	4	4

Source: ORCI for NREL (2000d), Study #70920, N=111.

Q5.2.9: Have you ever seen a copy of the Government's *Fuel Economy Guide* in the showroom, on the Internet, or anywhere else?

Table 5.2.9. Site of Review of the Government's *Fuel Economy Guide*

Place	Number	Percent
Any (net)	222	22
In a showroom	163	16
On the Internet	24	2
Anywhere else	64	6
Don't know/none of these	778	78
Total	1,000	100

Source: ORCI for NREL (1999a), Study #70809, N=1,000.

Q5.2.10: When you decide to buy a new vehicle, do you pay attention to the energy it uses or not? (Asked in European Union)

Table 5.2.10. Europeans Who Do Consider Energy Use when Purchasing a Vehicle

Country	Percent
Sweden	75
Austria	73
Germany	70
Denmark	68
Italy	67
Finland	66
All European Union	62
Netherlands	61
Spain	61
Greece	61
Luxembourg	59
Belgium	59
France	56
United Kingdom	52
Ireland	42
Portugal	41

Source: The European Opinion Research Group (2002), N = 16,032.

5.3 VEHICLE OWNERS' DECISIONS ABOUT ADVANCED TECHNOLOGY VEHICLES

Hybrid Electric Vehicles

Currently three hybrid electric vehicles are available in the United States: the Toyota Prius, roughly the size of a Corolla, the Honda Insight, a two-seat vehicle, and the Honda Civic, comparable to the non-hybrid Civic. The Insight has Environmental Protection Agency ratings of 61 and 68 miles per gallon in city and highway driving, respectively. The Prius is rated at 55 miles per gallon for combined city and highway driving. Both cars can achieve speeds of more than 100 miles per hour (*The Washington Post*, 2001). Surveys also indicate that the public is interested in hybrid electric SUVs. Both those car buyers who are considering and those who are not considering the purchase of an SUV have a more favorable view of hybrids (Table 5.3.2).

According to surveys, American drivers are increasingly aware of hybrid electric vehicles, but only about half of them could name one (Tables 5.3.1, 5.3.2). According to Honda, buyers of hybrid electric vehicles tend to be technology enthusiasts who want to be the first in their neighborhood to get the car. They are also more likely to be environmentalists who want cars that conserve gasoline and pollute less. In addition, they tend to be young people who just think it is a fun car. Toyota's profile of a Prius buyer is different. Seventy-one percent of Prius buyers are men. Buyers have an average age of 53, a college education and a median income of \$85,900 a year (*The Washington Post*, 2001).

Q5.3.1: There are some cars in the U.S. market today that have advanced hybrid-electric powertrains that combine a small electric motor and a small gasoline engine to achieve a higher fuel economy than similar cars. How much have you heard about this technology: a great deal, some, very little, or nothing?

Table 5.3.1. Amount of Information Heard Pertaining to
Advanced Hybrid-Electric Powertrains

	August 2000	November 2001	November 2002
A Great Deal	13%	10%	20%
Some	33%	33%	35%
Very Little	34%	30%	26%
Nothing	20%	26%	18%
Don't Know	0%	2%	1%

Source: ORCI for NREL (2000) N=953, (2001) N=999, (2002c) N=999.

Q5.3.2: Please name one of these hybrid-electric cars if you can.

Table 5.3.2.1 Names of Advanced Hybrid-Electric Vehicles Known by the Public

	August 2000	November 2001	November 2002
Any	36%	44%	51%
Honda	15%	24%	24%
Insight	1%	2%	2%
Civic	NA	NA	2%
Toyota	4%	11%	10%
Prius	1%	2%	6%
Other	14%	6%	7%
Don't Know	64%	56%	48%

Source: ORCI for NREL (2000) N=953, (2001) N=999, (2002c) N=999.

A 2003 survey of in-market consumers by Kelley Blue Book examined the influence of the media on attitudes towards SUVs. Although no hybrid-electric SUVs are available in the U.S, shoppers would think favorably of such an option and might be more likely to consider the purchase of an SUV.

Table 5.3.2.2 Public's Attitudes Towards Hybrid-Electric SUVs

	Total		SUV Considerers		SUV Non-Considerers	
	Jan 2003	Mar 2003	Jan 2003	Mar 2003	Jan 2003	Mar 2003
More favorable towards SUVs	48%	45%	52%	46%	45%	44%
Neutral	42%	49%	40%	46%	44%	51%
Less favorable towards SUVs	10%	6%	8%	7%	11%	5%

Source: Kelley Blue Book (2003).

Diesel Vehicles

A recent survey conducted by J.D. Power and Associates showed that over half of current diesel vehicle owners would pay a premium of \$2000 or more for a cleaner diesel engine (Table 5.3.3). Of gasoline vehicle owners, only 12% were willing to pay that much and 34% said they were not willing to pay any additional premium for a clean diesel vehicle. In 1998, on average, Americans said they would be willing to pay \$837 extra for a diesel engine that gets 30 miles per gallon compared to a gasoline engine that gets 20 miles per gallon² (Table 5.3.4). In 2001, slightly more than one in four drivers would rather purchase a new diesel vehicle that gets 40 percent more miles per gallon but costs additional \$2,000 than a gasoline one (Table 5.3.5).

When asked about reasons for choosing a diesel over a gasoline vehicle, almost one in two U.S. adults mentioned fuel economy and the advantage of getting 40 percent more miles per gallon, in particular (Table 5.3.6). Those who preferred a gasoline to a diesel vehicle referred to environmental concerns, such as diesel engines being loud or noisy and having an odor or smell. A few American drivers mentioned engine problems including difficult starting in winter and slow acceleration as a reason for rejecting the diesel vehicle. Some reported negative experiences with diesel (Table 5.3.7). At higher fuel prices, more consumers prefer a clean, fuel-efficient diesel vehicle over gasoline vehicles and even hybrid-electric gasoline vehicles (Table 5.3.8).

Q5.3.3: Would you consider buying a diesel engine version that got 40 percent better fuel economy and costs an additional \$1,500?

Table 5.3.3.1 Public's Willingness to Consider the Purchase of a Diesel Engine With a 40 Percent Increase in Fuel Economy and Additional Costs of \$1,500

Considerations of Diesel Engine Options	Percent
Would consider buying a diesel engine version that got 40% better fuel economy and costs an additional \$1,500.	21
Would not consider buying a diesel engine version that got 40% better fuel economy and costs an additional \$1,500.	75
Don't know	4
Total	100

Source: ORCI for NREL (1997, Study #70627), N=1010

² Gasoline and diesel engines were defined as equally clean, dependable, powerful, odorless, and smooth running.

Table 5.3.3.2 Public's Willingness to Pay a Premium for a Clean Diesel Engine

Premium Willing to Pay For Clean Diesel	Total (%)	Current Diesel Owner (%)	Current Gas Owner (%)
\$0	33	10	34
\$1 - \$199	8	4	8
\$200 - \$399	7	1	7
\$400 - \$599	16	8	17
\$600 - \$999	4	3	4
\$1,000 - \$1,499	14	17	14
\$1,500 - \$1,999	4	5	4
Over \$2000	14	51	12

Source: J.D. Power and Associates (2002)

Q5.3.4: If you had a choice between two engines for your next vehicle, both engines equally clean, powerful, odorless, and smooth running, one using gasoline and getting 20 miles per gallon, and one using diesel fuel and getting 30 miles per gallon, how much **extra** would you be willing to pay for the diesel one?

Table 5.3.4. Additional Amount the Public is Willing to Pay for a Diesel Engine Getting 30 Miles per Gallon Compared to a Gasoline Engine Getting 20 Miles per Gallon

Dollar Amount	Total		Type of New Vehicle Most Likely to Buy													
	n	%	Small Car		Midsize Car		Large Car		Pickup Truck		Standard Van		Minivan		SUV	
			n	%	n	%	n	%	n	%	n	%	n	%	n	%
\$500 or less	63	7	9	10	16	5	3	3	15	9	1	4	9	12	11	6
\$501–\$1,000	79	8	11	12	24	7	2	3	18	11	1	6	10	13	11	6
\$1,001–\$2,000	81	8	7	7	29	9	9	10	12	7	1	6	7	8	16	9
\$2,001–\$5,000	71	7	5	6	16	5	9	9	22	14	1	6	3	3	16	9
More than \$5,000	20	2	1	2	8	2	0	0	4	3	0	0	1	2	5	3
None	533	55	48	51	197	59	59	62	76	47	14	73	41	52	96	54
Don't know	114	12	11	12	43	13	12	13	16	10	1	5	8	10	22	13
Mean¹ (including none)	\$837		\$723		\$730		\$707		\$1,116		\$507		\$692		\$1,106	
Mean¹ (excluding none)	\$2,255		\$1,740		\$2,273		\$2,507		\$2,299		\$2,264		\$1,635		\$2,688	

Source: ORCI for NREL (1998a), Study #707089, N=961.

¹ In this report, calculation of means, medians and standard deviations are based on raw numbers. “Don’t know” responses are not part of the calculations.

Q5.3.5: Assume that a new vehicle you want to buy has two engine options that are equally clean, dependable, powerful, odorless, and smooth running. One uses gasoline and the other uses diesel fuel and gets 40 percent more miles per gallon but costs \$2,000 more. Which engine option would you buy?

Table 5.3.5. Purchase Preference Between Diesel and Gasoline Vehicles by Vehicle Type

Vehicles	Total		Vehicle Type										Don't Know Which Type of Vehicle to Buy	
			Small Car		Large Car		Minivan		SUV		Pickup/Van			
	n	%	n	%	n	%	n	%	n	%	n	%		
Gasoline	703	71	178	75	186	81	73	71	126	62	124	65	15	60
Diesel	266	27	50	21	41	18	28	27	75	37	65	34	7	28
Don't know	20	2	9	4	3	1	2	2	2	1	1	1	3	12
Total	989	100	237	100	230	100	103	100	203	100	190	100	25	100

Source: ORCI for NREL (2001c), Study #710288, N=989.

If chose diesel, ask:

Q5.3.6: Why did you choose the diesel option?

Table 5.3.6. Reasons for Choosing a Diesel Option

Reasons	Total	
	n	%
Fuel economy (net)	121	46
Better gas mileage/fuel economy	100	38
40% better mileage/miles per gallon	22	8
Cost (net)	90	34
Saves money/pays for itself over time/in the long run	45	17
Less expensive/cheaper than gasoline	32	12
Economy/economical	18	7
Dependability (net)	33	12
Diesel engine lasts longer	19	7
Diesel engine more reliable/dependable	18	7
Environmental (net)	26	10
Cleaner/burns cleaner	18	7
All other environmental mentions	9	3
I have/drive vehicle with diesel engine	11	4
More power/horsepower	8	3
Previous positive experience/satisfied with diesel	7	3
Other /don't know	26	10

Source: ORCI for NREL (2001c), Study #710288, N=266.

If did not choose diesel, ask:

Q5.3.7: Why did you reject the diesel option?

Table 5.3.7. Reasons for Rejecting a Diesel Option

Reasons	Total	
	n	%
Environmental (net)	282	39
Loud/noisy/too much noise	140	19
Odor/smell/stink	119	16
Pollutes the air	32	4
All other environmental mentions	53	8
Cost (net)	135	19
Cost /expense (unspecified)	71	10
The initial cost /\$2000 more	34	5
All other cost mentions	37	5
Lack of fuel availability	123	17
Don't know enough/know nothing about it/never owned one	78	11
Engine problems (net)	57	8
Difficult to start in winter	37	5
All other engine problems mentions	21	3
Just don't like diesel/husband doesn't like diesel	48	7
Prefer/used to/satisfied with gasoline	34	5
Negative experience	28	4
Previous negative experience and heard of others' bad experiences	28	4
Difficult to maintain/repair	22	3
Other	28	4
Don't know	28	4

Source: ORCI for NREL (2001c), Study #710288, N=723.

Table 5.3.8. Consumer Preference for Fuel-Efficient Vehicles

Preference	At current gas price	At \$1.50 - \$1.99/ gallon	At \$2.00 - \$2.49/ gallon
A more fuel-efficient <i>clean diesel</i> vehicle	27	39	56
A more fuel-efficient <i>hybrid electric</i> vehicle	22	24	38
A conventional <i>gasoline</i> vehicle	51	37	6
Total	100	100	100

Source: J.D. Power and Associates (2002).

6. TRAVEL AND TRANSPORTATION MODES

6.1 AIR TRAVEL

The Travel Industry Association of America (TIA) reports that business travel is down more than 10% since 2000, largely due to the weak economy. Over one-quarter (26%) of business travelers are traveling less or not at all this spring and summer compared to last year. Only 9% say that they plan to travel more this year. Of those traveling less, 39% responded that the reason was reduced travel budget, 38% responded no need to travel, 29% blamed the high cost of travel, 21% said they did not want to be away from home, and 15% responded that trips were restricted by their employers.

In leisure travel, 33% of past year travelers changed their plans due to the economy, compared to only 22% who changed plans because of the threat of war. Of those who changed their plans for any reason, 43% decided to travel closer to home, 41% delayed planning, 37% took shorter trips, 28% avoided flying, and 26% changed their plans to obtain a cheaper rate. In 2002, driving trips increased by 2%. 71% of Americans said that they were not interested in traveling overseas. However, 81% still plan on traveling for leisure this spring and summer. 46% had not yet made their plans as of early spring.

Immediately after the events of September 11, 2001, TIA conducted surveys to measure Americans' attitudes towards travel. At that time, 58% of participants said that they planned to take at least one leisure trip in the next six months. Of those who were not planning to travel over the next six months, 22% said that financial concerns were the reason. Safety and security concerns were issues for 15% of those not planning to travel, and lack of time was the reason cited by 18% of those not planning to travel. Other reasons given were health, high prices (including high fuel prices), and inconvenience. The majority of those surveyed (72%) felt that it was important for Americans to continue to travel as they did before the terrorist attacks occurred.

Q6.1.1 How many air trips, if any, have you taken on a commercial airliner in the past twelve months -- counting each round trip as one trip?

Table 6.1.1.1 Number of Air Trips Taken in Past 12 Months

	November 1999	February 2000	August 2000	November 2001	February 2002	September 2002
None	54	55	55	50	48	61
1-2	26	25	26	31	32	24
3-4	13	9	10	10	11	9
5 or more	7	11	9	9	9	6
No opinion	--	--	--	0	0	0
Mean (incl. 0)	1.7	2.1	1.8	2.0	1.9	1.8

Source: Gallup Poll (2002a) N=1,003.

Table 6.1.1.2 Number of People Planning Spring Travel (March, April, May)

Year	Million Person-Trips
1999	233.3
2000	235.3
2001	244.4
2002	238.2
2003	234.4

Source: Travel Industry Association (2003).

Q6.1.2 As a result of the events that occurred on September 11, 2001, would you say that now you are less willing to fly on airplanes or not?

Table 6.1.2. Public's Willingness to Fly on Airplanes after the Events of September 11, 2001

	September 2001	March 2002	May 2002	September 2002
Less willing	43	33	27	33
No, not less willing	56	64	69	65
More willing	--	1	1	1
No opinion	1	2	3	1

Source: Gallup Poll (2001d) N=N/A, (2002a) N=496.

Q6.1.3 As a result of the events that occurred on September 11, 2001, would you say that now you are less willing to travel overseas or not?

Table 6.1.3.1 Public's Willingness to Travel Overseas after the Events of September 11, 2001

	September 2001	March 2002	May 2002	September 2002
Less willing	48	45	43	47
No, not less willing	48	52	52	50
More willing	1	1	1	--
No opinion	3	2	4	3

Source: Gallup Poll (2001d) N=N/A, (2002a) N=496.

Table 6.1.3.2 Travelers who Changed their Travel Plans Made Prior to September 11, 2001

	September 2001	October 2001
No changes	69	77
Cancelled	12	14
Rescheduled	8	4
Made some other change	11	5

Source: Gallup Poll (2001) N=N/A.

Q6.1.4 Have you changed your mind about traveling as a result of a new disease known as Severe Acute Respiratory Syndrome, or SARS, or not? (Adults who either traveled by air in the past month or do or did have plans to travel by air in the next six months)

Table 6.1.4.1 Travelers who Changed their Mind About Traveling as a Result of SARS

Changed your mind	Percent
Yes	14
No	86
No opinion	--
Total	100

Source: Gallup Poll (2003a) N=1,001.

Table 6.1.4.2 Reasons Why Public has not Begun Planning Intended Spring/Summer Travel

Reason	Percent
Not yet decided where to go	63
Not yet decided when to take trip	42
Still unsure how much can spend	33
Not yet decided which mode to use	21
Unsure of number in travel party	18
Waiting to see if travel prices will go down	16
Waiting until date gets closer	13
Other	3

Source: Travel Industry Association (2003).

6.2 TRAFFIC

With more vehicles on the roads and each vehicle traveling more miles each year, it is not surprising that traffic congestion is becoming a problem in many locations around the country. A study by the Texas Transportation Institute reported that the average American spends 36 hours per year stuck in traffic. A Gallup poll conducted in May 2000 found that 19% of those asked said that traffic was a major problem and another 31% said it was a minor problem. In suburban areas, 24% responded that traffic was a major problem, compared to 19% in urban areas and 9% in rural areas. Among those who drive to work, one-quarter (25%) reported getting stuck in traffic several times a week or every day.

Most Americans believe that traffic has worsened over the last five years and that it will only continue to get worse. In the same Gallup poll, 61% responded that they thought that traffic would get worse in their area over the next five years, while 23% thought it would stay the same and 15% thought it would improve. Of those who drive to work, more than three out of 10 have made some change to their schedule to accommodate the worsening traffic. At least 60% have changed the time at which they travel or the routes they take to reach their destination because of travel delays. Dissatisfaction with traffic flow is a major contributor to increased dissatisfaction with highways. 43% of travelers surveyed were dissatisfied with traffic flow in 2000, compared to just 23% five years earlier.

Q6.2.1: What part of driving do you find most irritating?

Table 6.2.1. Public Ranking of the Most Irritating Part of Driving

Most Irritating Part of Driving	Percent
Traffic congestion	40
Other drivers	31
Cost	12
Road conditions	10
Other/ don't know	7
Total	100

Source: ORCI (2002), N=1,005.

Q6.2.2: Travelers who reported trip delays were asked to name the main reason for the delays.

Table 6.1.2. Most Important Reasons for Travel Delays

Reason for Trip Delay	Percent
Heavy traffic	53
Roadwork	26
Accidents	10
Traffic signals	10

Source: FHWA Operations and Planning/Environment Survey (2000).

Q6.2.3: Which of the following best describes your view of the traffic you encounter in your area every day?

Table 6.2.3. Public's View of Daily Traffic

Best Describes Daily Traffic	Percent
Major inconvenience and problem	19
Minor inconvenience and problem	31
Not a significant problem	48
No opinion	2

Source: Gallup (2000b) N=601.

Q6.2.4: Looking ahead, do you anticipate that the traffic in your area today will get much better, somewhat better, stay the same, get somewhat worse, or get much worse over the next five years?

Table 6.2.4. Public's View of Future Traffic

Best Describes Future Traffic	Percent
Get much better	5
Get somewhat better	10
Stay the same	23
Get somewhat worse	33
Get much worse	28
No opinion	1

Source: Gallup (2000b) N=601.

Q6.2.5: Have you had to change your life or schedule in any way because of traffic in recent years? In what ways?

Table 6.2.5.1 Have Changed Schedule Because of Traffic

Percent	
Yes	31
No	69

Source: Gallup (2000b) N=601.

Table 6.2.5.2 Ways Public has Changed Because of Traffic

Changes Because of Traffic	Percent
Leave earlier	36
Take alternate routes	18
Allow more time for travel	13
Avoid driving at certain times	12
Don't drive as much	7
Changed working hours	6
Moved	5
Use mass transit or carpool	3
Work at home/ telecommute	1

Source: Gallup (2000b) N=318.

Q6.2.6: Did you experience any significant travel delays with traveling in a personal vehicle in January? Please tell me whether those delays caused you to [do any of the following].

Table 6.2.6.1 Have Experienced Travel Delays

Percent	
Yes	18
No	82

Source: Bureau of Transportation Statistics (2003).

Table 6.2.6.2 Ways Public has Changed Because of Traffic (More than one answer allowed)

Changes Because of Traffic	Percent
Time of day traveled	46
Type of transportation used	8
Route to reach destination	64
Postpone travel to another day	12
Cancel trip entirely	5

Source: Bureau of Transportation Statistics (2003).

Table 6.2.6.3 Decisions Affected by the Amount of Traffic

Decisions Affected by Traffic	Percent
When to travel/ which roads to take	66
Where to live now	30
Which hours to work	21
Where to work	19

Source: FHWA Infrastructure Survey (2000).

Q6.2.7: How often do you, yourself, get stuck driving in traffic jams?

Table 6.2.7. Frequency of Getting Stuck in Traffic Jams

Frequency of Traffic Jams	Percent
Every day	11
Several times a week	14
Several times a month	22
A few times a year	31
Never	20

Source: Gallup (2000b) N=318.

Q6.2.8: As opposed to other means of transportation, please tell me the main reason you used public transit last month?

Table 6.2.8. Reasons for Using Public Transit

Reason for Using Public Transit	Percent
Have no vehicle available	30
Cheaper/costs less/saves money/expensive parking	15
Faster than other means of transportation	4
More convenient than other means of transportation	44
Less impact on the environment than other means of transportation	1
Parking not available	2
Away from home on business or pleasure travel	3
Other	1

Source: Bureau of Transportation Statistics (2003).

REFERENCES

- ABC News/*Washington Post* poll. (2001). May 31–June 3.
- Bureau of Transportation Statistics poll (2003).
- Birky et al. (2001). *Future U.S. Highway Energy Use: A Fifty Year Perspective*, draft, February.
- The European Opinion Research Group (2002). *Public Opinion on Energy: Issues, Options, and Technologies*.
- FHWA Infrastructure Survey (2000).
- FHWA Operations and Planning/Environment Survey (2000).
- Gallup Poll. (2003a). April 22-23.
- Gallup Poll. (2003b). March 3-5.
- Gallup Poll. (2003c). February 17-19.
- Gallup Poll. (2002a). September 2-4.
- Gallup Poll. (2002b). March 4-7.
- Gallup Poll. (2001a). June 28–July 1.
- Gallup Poll. (2001b). May 7–9.
- Gallup Poll. (2001c). March 5–7.
- Gallup Poll. (2000a). June 22–25.
- Gallup Poll. (2000b). May 23–24.
- Gallup Poll. (2000c). March 30–April 2.
- Gallup Poll. (2000d). March 10–12.
- Harris Poll (2003).
- IPSOS-REID Inc. poll. (2001). November 14.
- J.D. Power and Associates 2002 Clean Diesel Market Assessment Study.
- Kelley Blue Book New Vehicle-Buyer Attitude Studies.
- NBC News/*Wall Street Journal*. (2001). June 23–25.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2003a). *Purchasing Your Next Vehicle*, March 13.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2002a). *Fuel Economy Guide for Vehicles*, March 1.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2002b). *Higher Fuel Economy Options*, March 21
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2002c). *Hybrid Electric Vehicles*, November 14.

- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2001a). *U.S. Dependence On Imported Oil*, Study #710148, April 5.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. 2001b. *Fuel Economy*, Study #710449, November 2.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2001c). *Purchasing A New Car—Gasoline Versus Diesel*, Study #710288, July 12.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. 2000a. *Vehicles And Fuel*, Study #709318, August 3.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2000b). *Fuel For Use In Personal Vehicles*, Study #709489, December 1.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2000c). *Vehicles*, Study #709089, February 24.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (2000d). *Conventional And Optional Engines*, Study #70920, May 18.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. 1999a. *New Light Vehicles And Fuel. Closed-End Tabulations*, Study #70809, February 25.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (1999b). *Choosing A New Vehicle*, Study #70844, October 28.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (1998a). *New Vehicle Purchases*, Study #707089, February 19.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (1998b). *Gasoline/ Diesel Fuel Replacements*, Study #707349, August 20.
- (ORCI for NREL) Opinion Research Corporation International for National Renewable Energy Laboratory. (1997). *Diesel*, Study #70627, July 7.
- Pew Research Center for the People and the Press poll. (1997). November 13–17.
- (PIPA) Program on International Policy Attitudes. 2000. *Americans On Global Warming Treaty*, February 4.
- (PIPA) Program on International Policy Attitudes poll. (1998a). February–April.
- (PIPA) Program on International Policy Attitudes poll. (1998b). October 22–27.
- Research/Strategy/Management, Inc. (2001). *U.S. Dependence on Oil Imports*, August 5.
- Research/Strategy/Management, Inc. (1998). *America Speaks Out On Energy: Foreign Oil Dependency*, October 21.
- Sustainable Energy Budget Coalition. (1996). *America Speaks Out On Energy: A Survey of Public Attitudes on Sustainable Energy Issues*, January.
- Travel Industry Association polls (2003). <http://www.tia.org/>
- (U.S. DOE/EIA) U.S. Department of Energy, Energy Information Administration. (2001a). *Monthly Energy Review*, November.

- (U.S. DOE/EIA) U.S. Department of Energy, Energy Information Administration. (2001b). *Emissions of Greenhouse Gases in the United States 2000*, DOE/ EIA-0573 (2000), Washington, DC, November.
- (U.S. DOE/EIA) U.S. Department of Energy, Energy Information Administration. (2003c). *International Petroleum Monthly*, April.
- Washington Post, The*. (2001). "Hybrid Cars Draw Waiting List of Buyers," May 3.
- World Wildlife Fund National Survey, World Wildlife Fund, August 15, 1997.
- Zogby International polls (2000 and 2001). <http://www.zogby.com/>.